FIG. 1

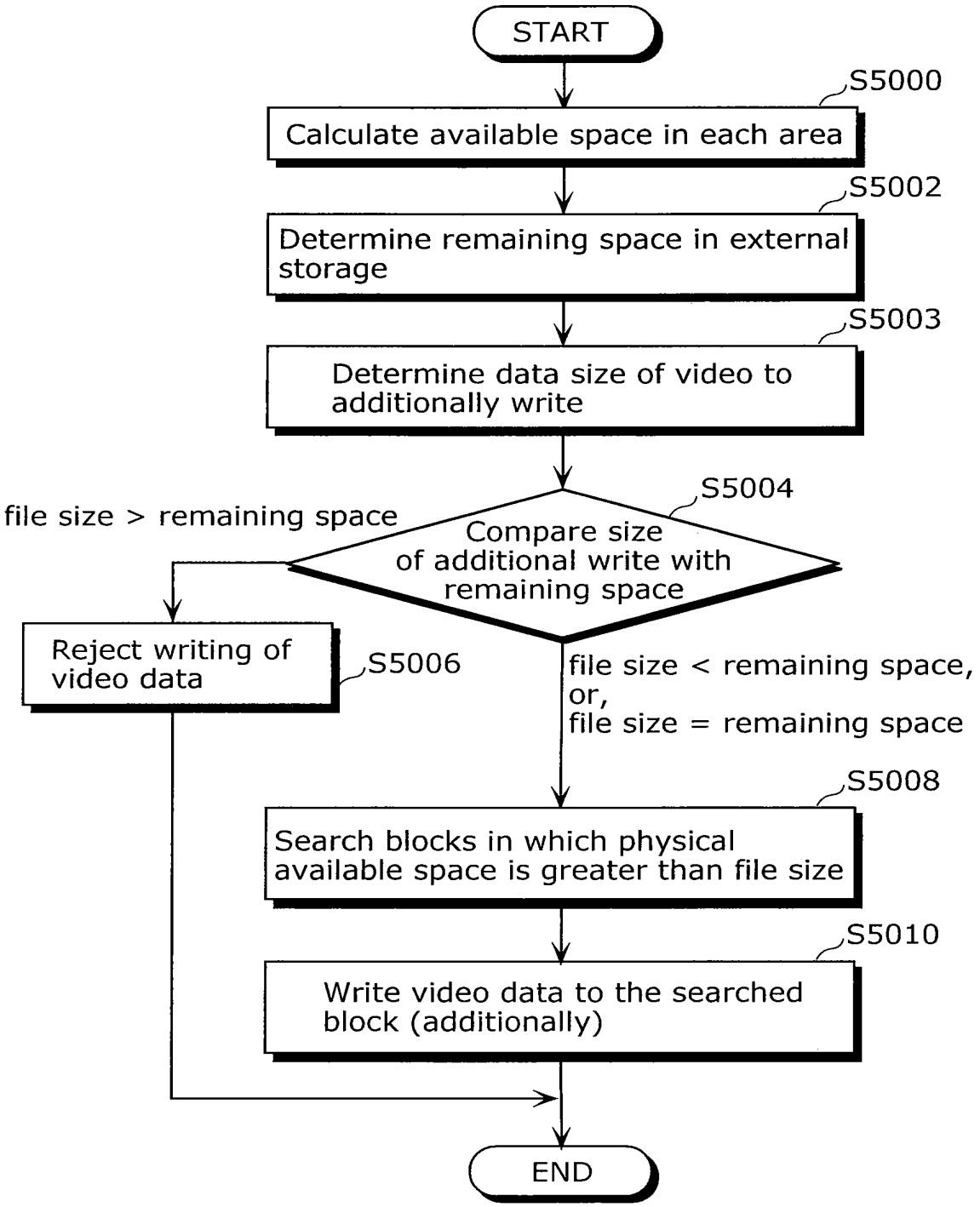
START
S5000
Calculate available space in each area
S5002
Determine remaining space in external storage
S5003
Determine data size of video to additionally write
S5004
Compare size of additional write with remaining space
file size > remaining space
Reject writing of video data
S5006
file size < remaining space, or, file size = remaining space
S5008
Search blocks in which physical available space is greater than file size
S5010
Write video data to the searched block (additionally)
END

FIG. 2

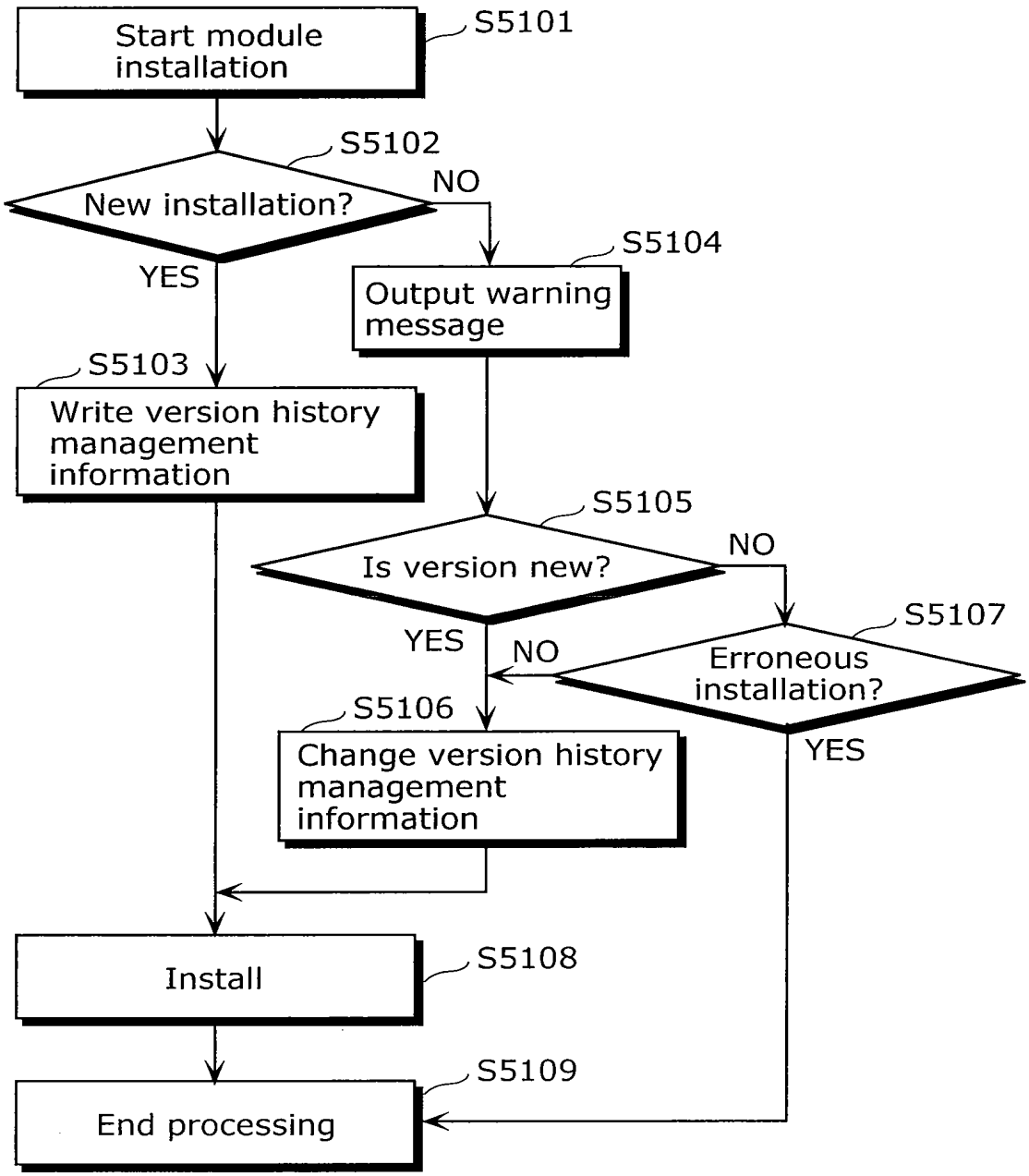
Start module installation
S5101
S5102
New installation?
NO
YES
S5104
Output warning message
S5103
Write version history management information
S5105
Is version new?
NO
YES
S5107
Erroneous installation?
NO
YES
S5106
Change version history management information
Install
S5108
S5109
End processing

FIG. 3

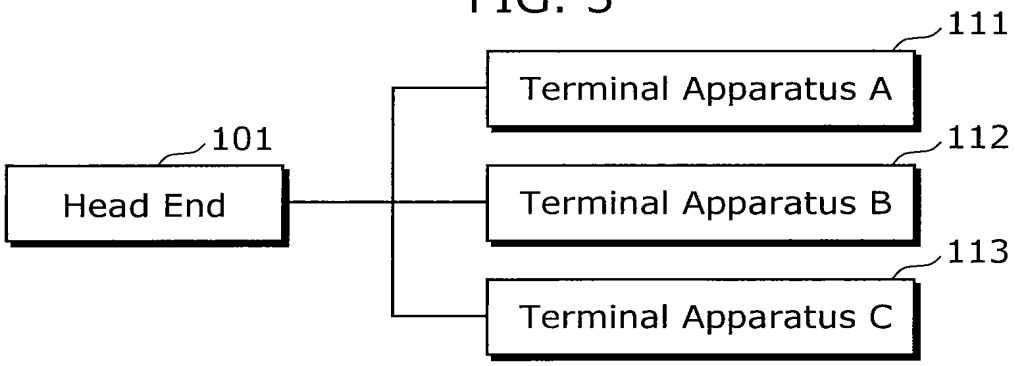

FIG. 4

Frequency	Use	Modulation Type
5~130MHz	Out Of Band (OOB) Data exchange between head end and terminal apparatus	QPSK
130~864MHz	In-band Normal TV broadcast that includes video/audio	QAM

FIG. 5

Frequency	Use
70~74MHz	Sending data from head end 101 to terminal apparatuses
10.0~10.1MHz	Sending data from terminal apparatus A111 to head end 101
10.1~10.2MHz	Sending data from terminal apparatus B112 to head end 101
10.2~10.3MHz	Sending data from terminal apparatus C113 to head end 101

FIG. 6

Frequency	Use
150~156MHz	TV channel 1
156~162MHz	TV channel 2
⋮	⋮
310~311MHz	Radio channel 2
⋮	⋮

FIG. 7

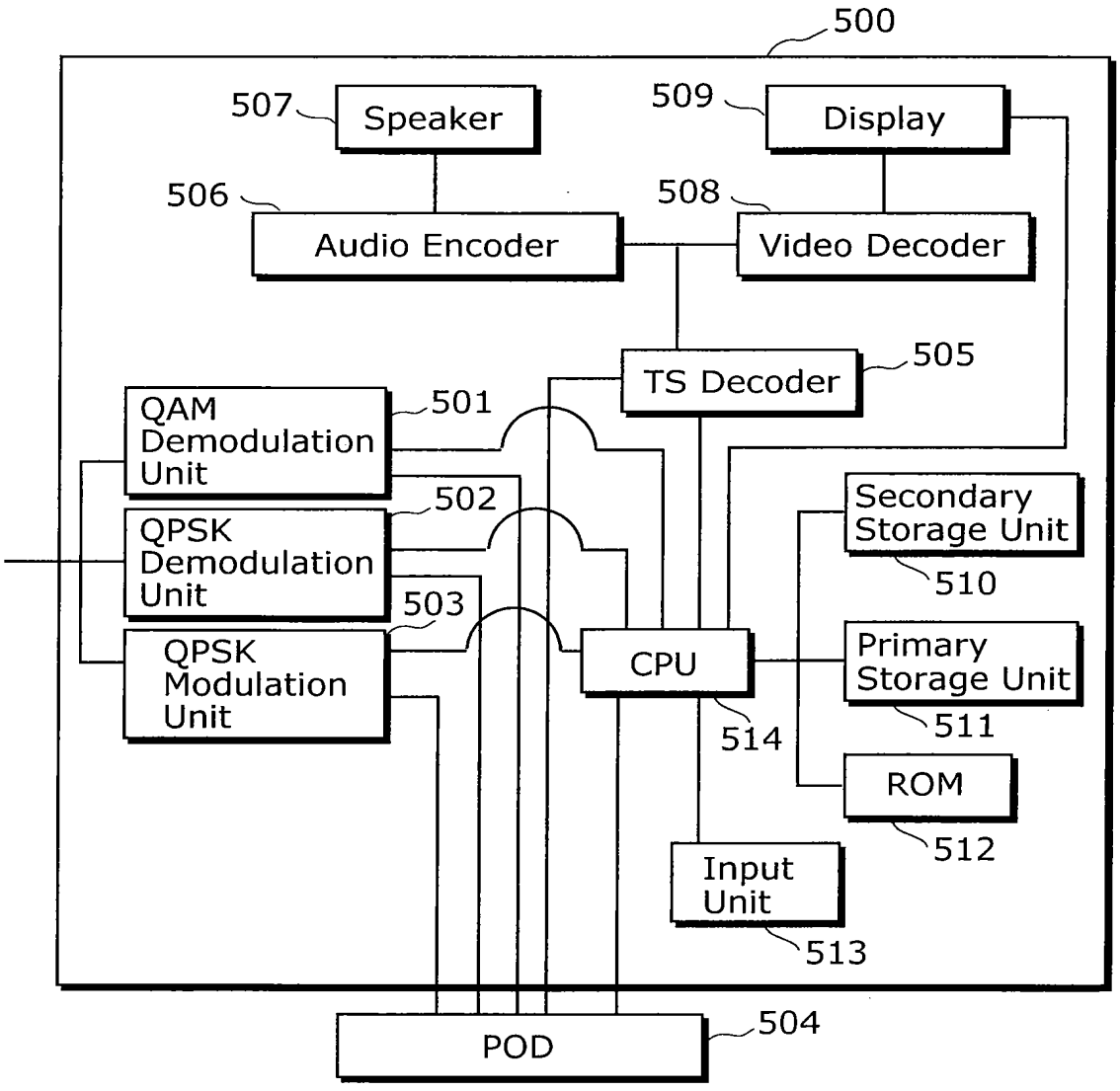
500
507
Speaker
509
Display
506
Audio Encoder
508
Video Decoder
505
TS Decoder
501
QAM Demodulation Unit
502
QPSK Demodulation Unit
503
QPSK Modulation Unit
Secondary Storage Unit
510
CPU
Primary Storage Unit
511
514
ROM
512
Input Unit
513
504
POD

FIG. 8

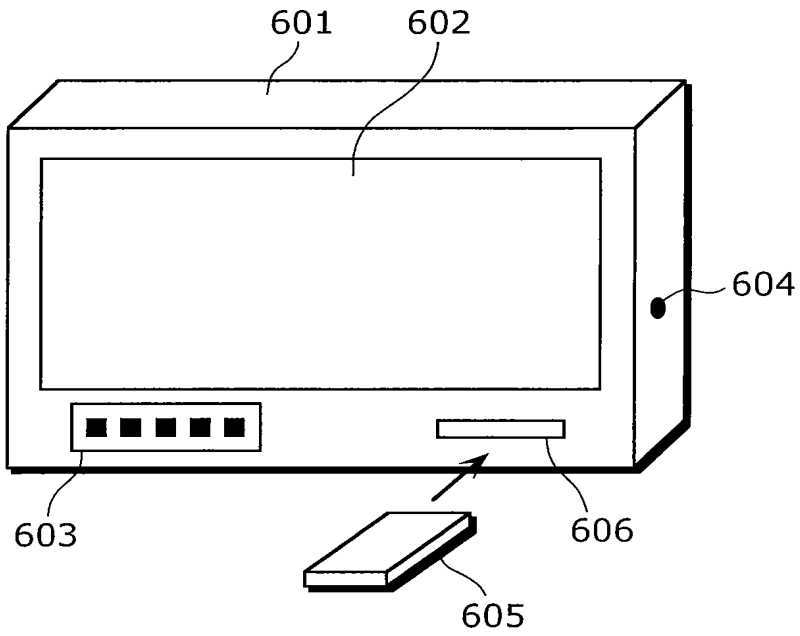
601
602
604
603
606
605

FIG. 9

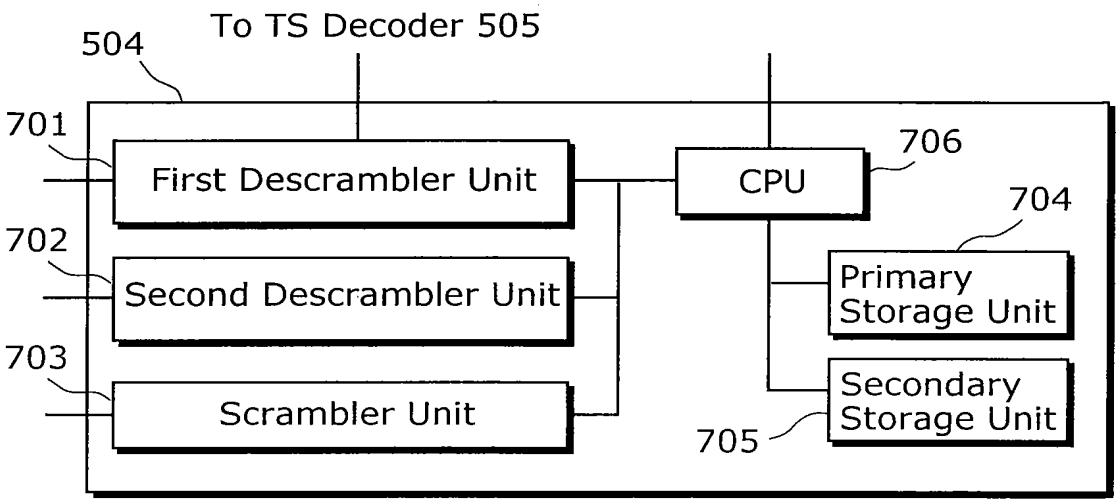
To TS Decoder 505
504
701
First Descrambler Unit
702
Second Descrambler Unit
703
Scrambler Unit
CPU
706
704
Primary Storage Unit
Secondary Storage Unit
705

FIG. 10

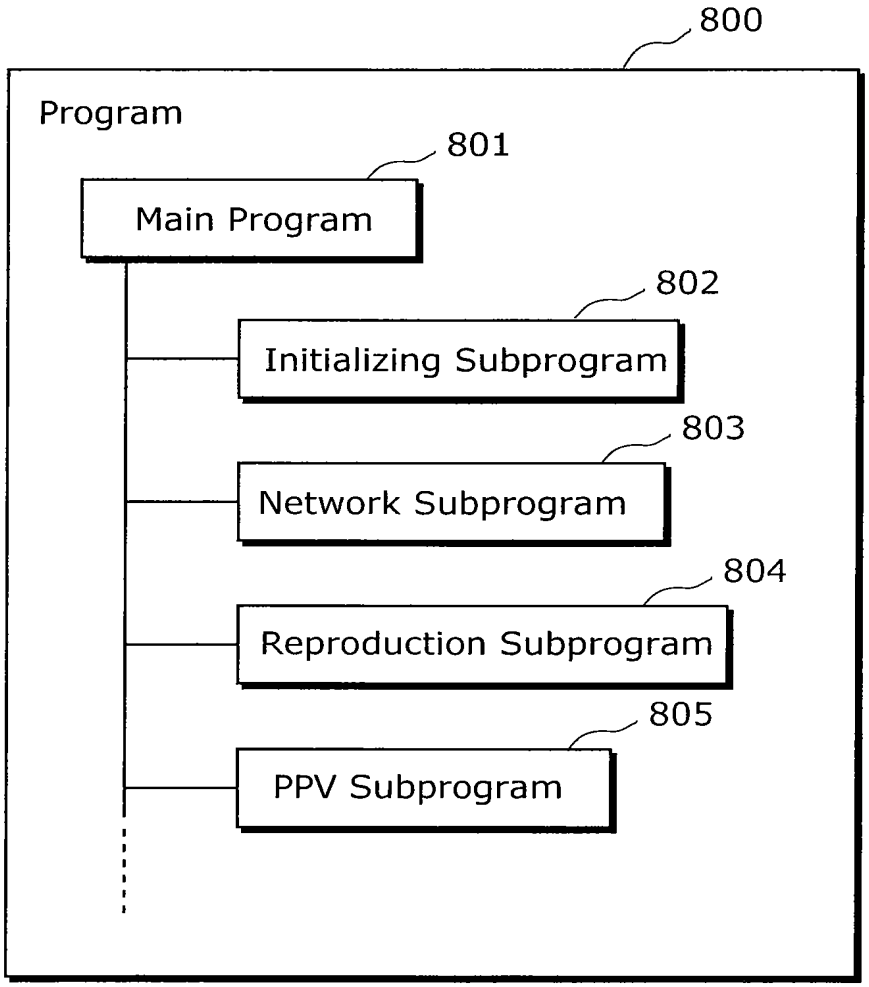
800
Program
801
Main Program
802
Initializing Subprogram
803
Network Subprogram
804
Reproduction Subprogram
805
PPV Subprogram

FIG. 11

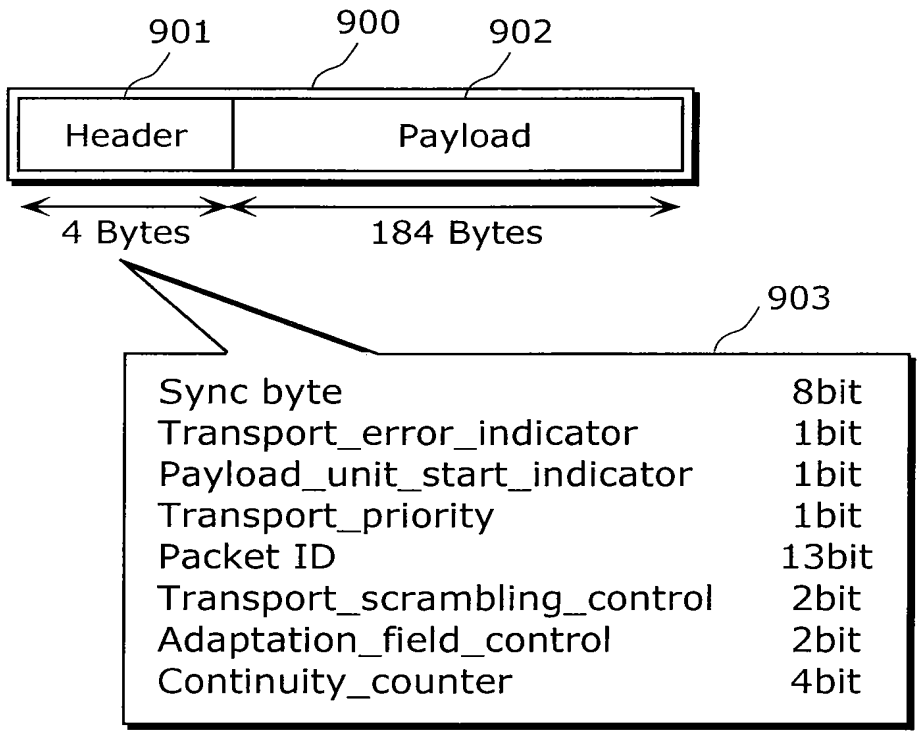
901
900
902
Header
Payload
4 Bytes
184 Bytes
903
Sync byte 8bit
Transport_error_indicator 1bit
Payload_unit_start_indicator 1bit
Transport_priority 1bit
Packet ID 13bit
Transport_scrambling_control 2bit
Adaptation_field_control 2bit
Continuity_counter 4bit

FIG. 12

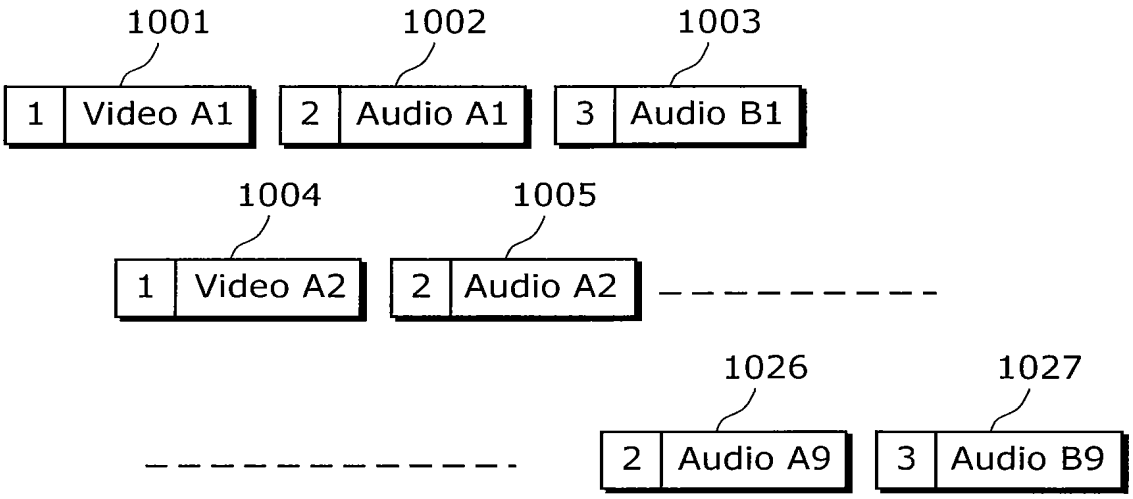
1001
1002
1003
1
Video A1
2
Audio A1
3
Audio B1
1004
1005
1
Video A2
2
Audio A2
1026
1027
2
Audio A9
3
Audio B9

FIG. 13

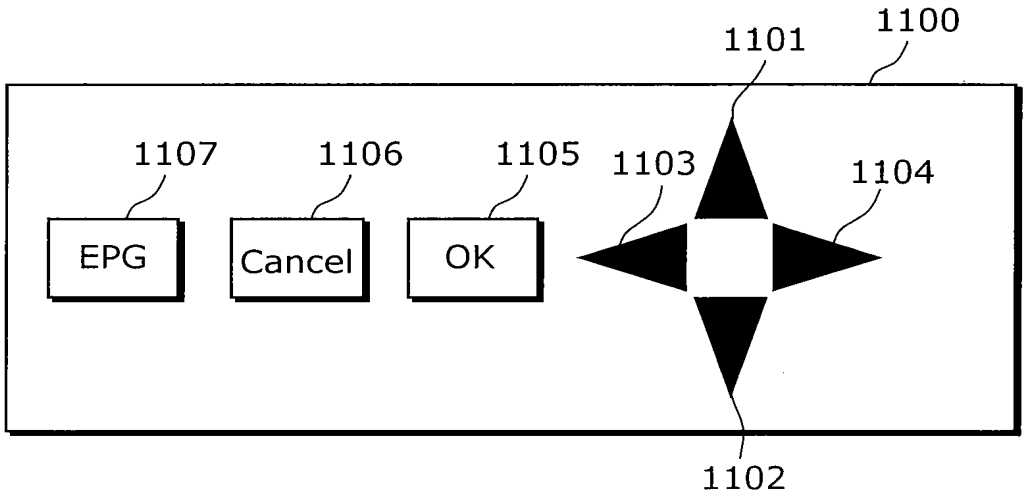
1101
1100
1107
1106
1105
1103
1104
EPG
Cancel
OK
1102

FIG. 14

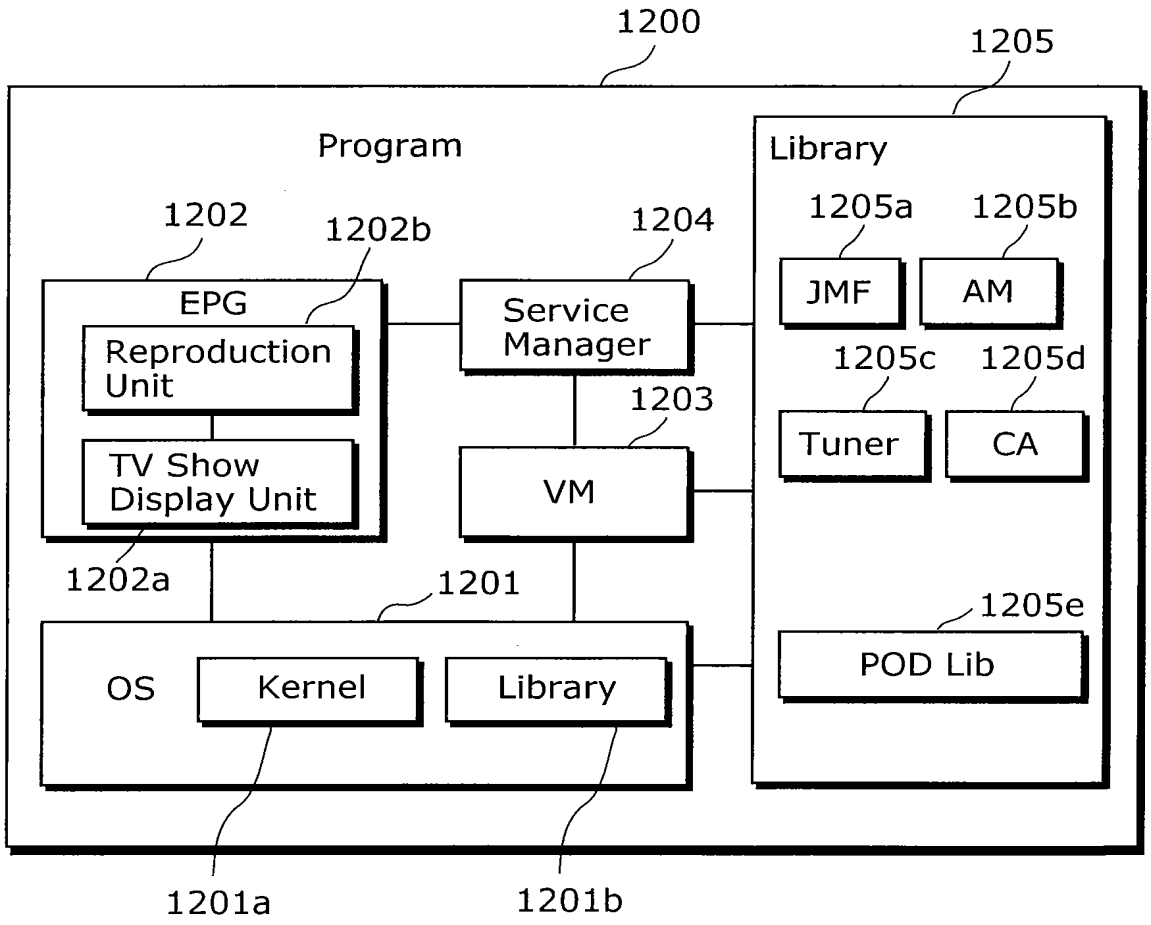
1200
1205
Program
Library
1202
1202b
1204
1205a
1205b
EPG
Reproduction Unit
TV Show Display Unit
Service Manager
JMF
AM
1205c
1205d
1203
Tuner
CA
VM
1202a
1201
1205e
OS
Kernel
Library
POD Lib
1201a
1201b

FIG. 15A

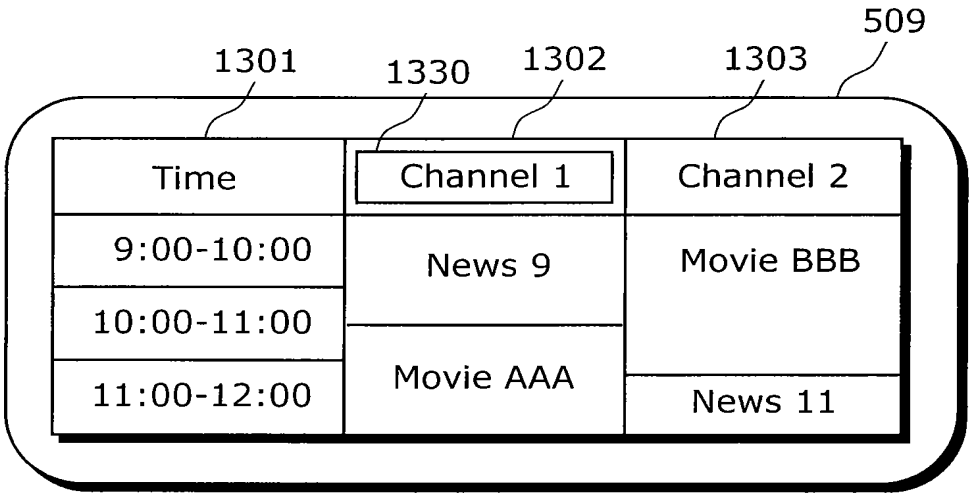

FIG. 15B

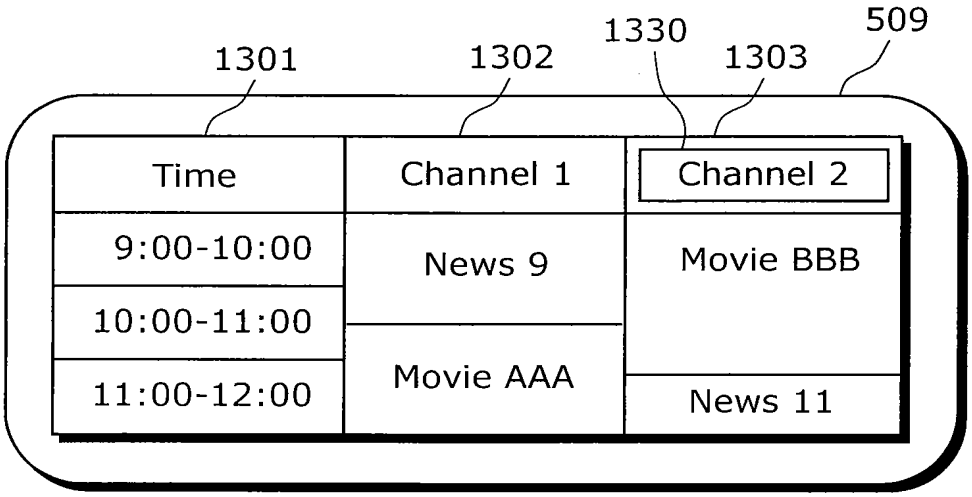

FIG. 16

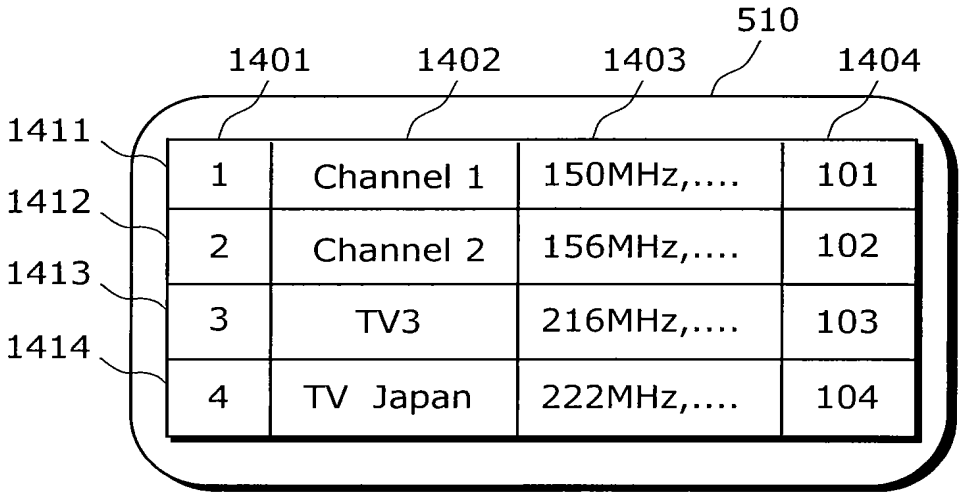

FIG. 17A

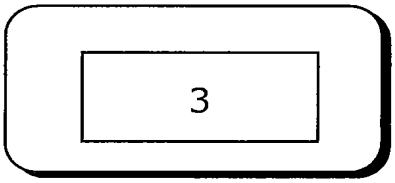

FIG. 17B

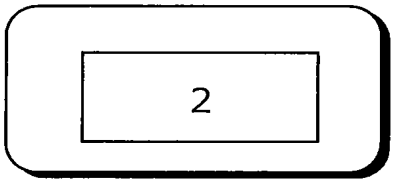

FIG. 17C

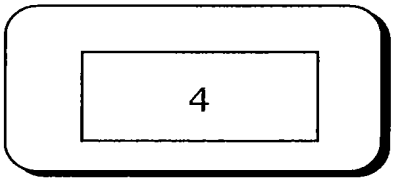

FIG. 18

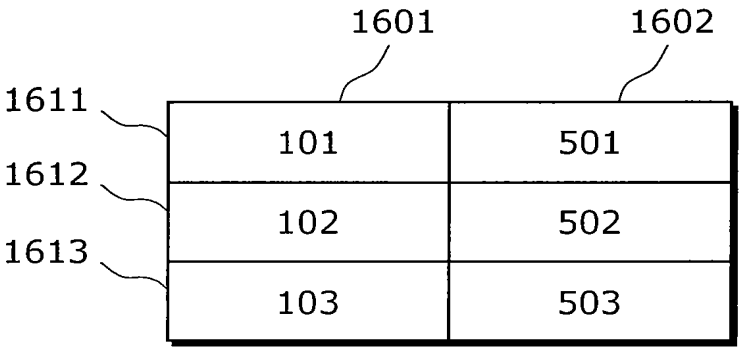
1601
1602
1611
1612
1613
101
501
102
502
103
503

FIG. 19

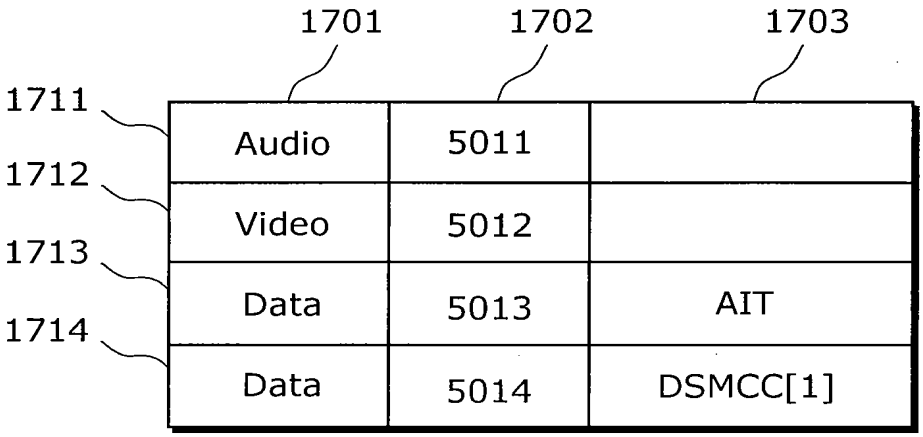
1701
1702
1703
1711
1712
1713
1714
Audio
5011
Video
5012
Data
5013
AIT
Data
5014
DSMCC[1]

FIG. 20

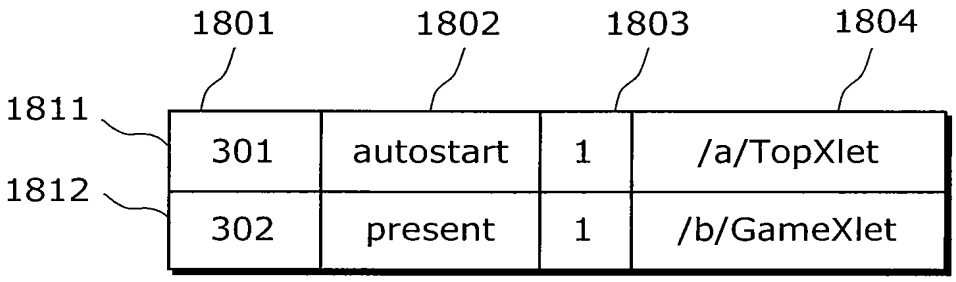
1801
1802
1803
1804
1811
1812
301
autostart
1
/a/TopXlet
302
present
1
/b/GameXlet

FIG. 21

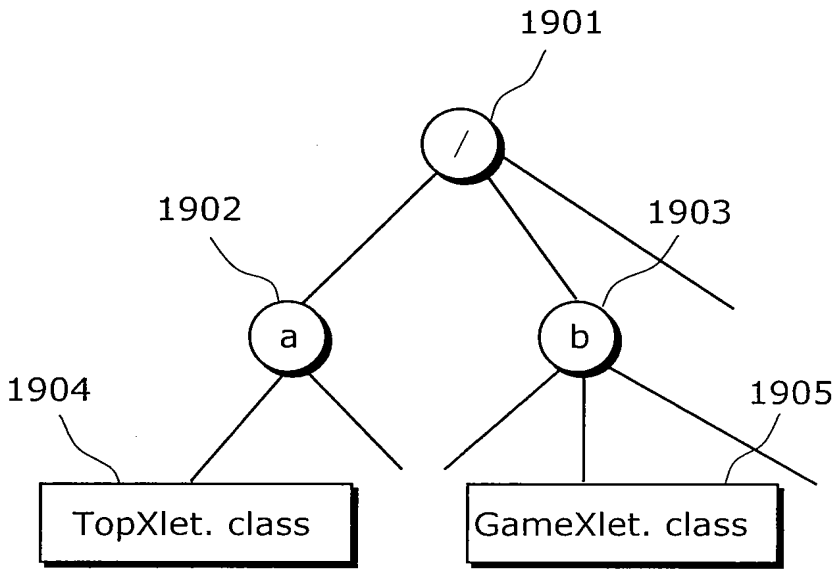
1901
/
1902
1903
a
b
1904
1905
TopXlet. class
GameXlet. class

FIG. 22

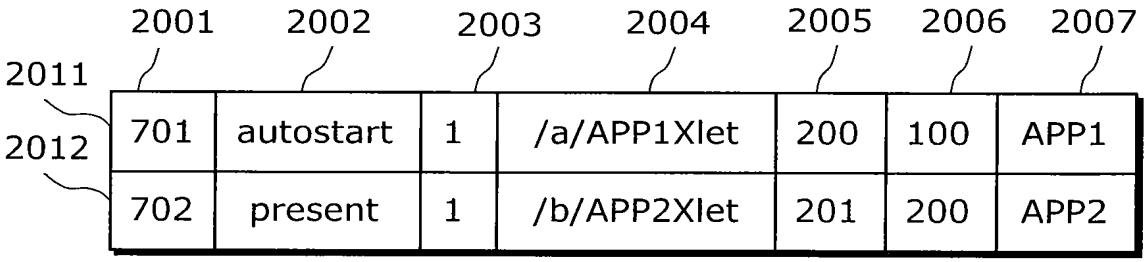
2001
2002
2003
2004
2005
2006
2007
2011
2012
701
autostart
1
/a/APP1Xlet
200
100
APP1
702
present
1
/b/APP2Xlet
201
200
APP2

FIG. 23

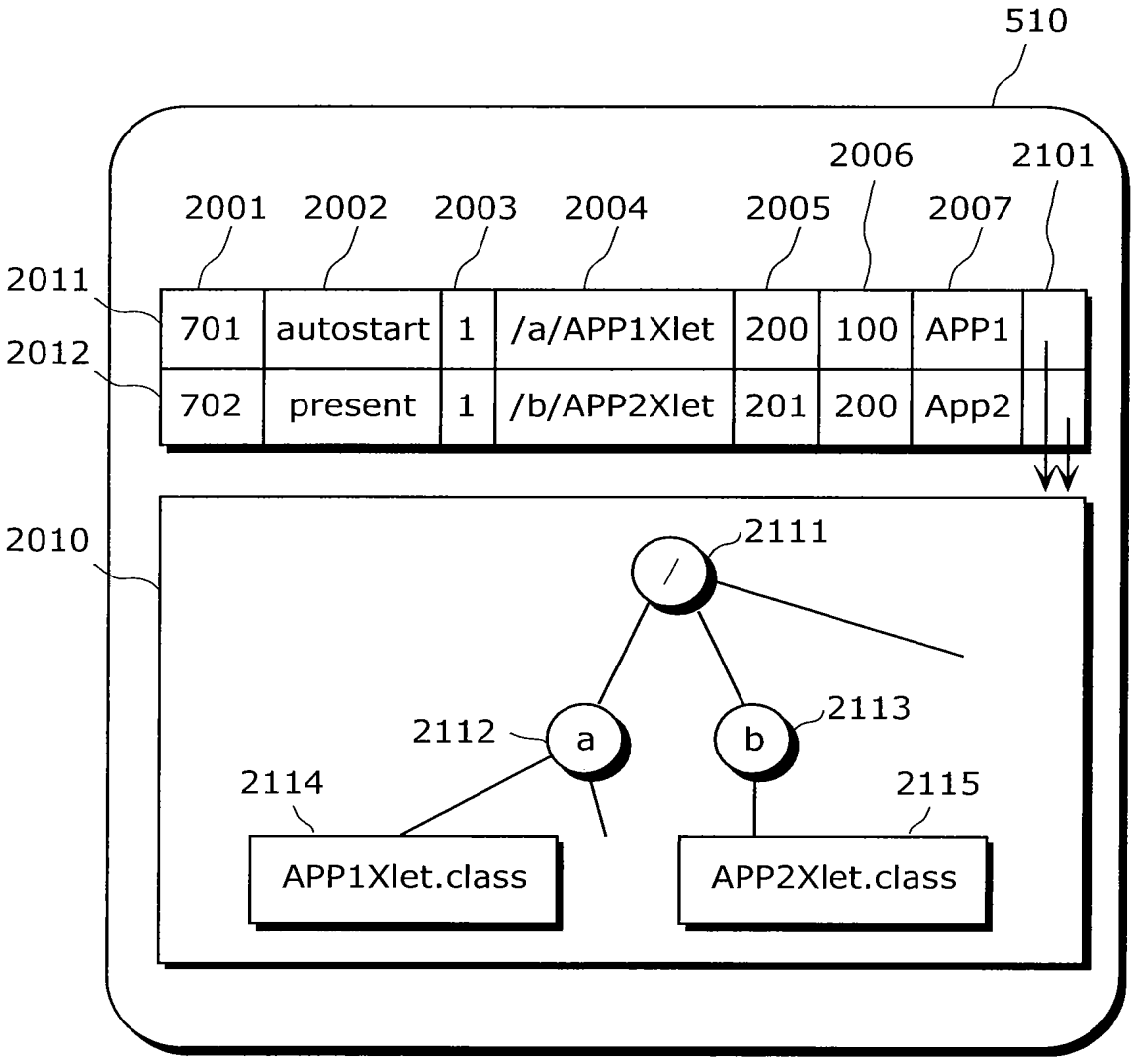
510
2001
2002
2003
2004
2005
2006
2007
2101
2011
2012
701
autostart
1
/a/APP1Xlet
200
100
APP1
702
present
1
/b/APP2Xlet
201
200
App2
2010
2111
/
2112
a
b
2113
2114
2115
APP1Xlet.class
APP2Xlet.class

FIG. 24

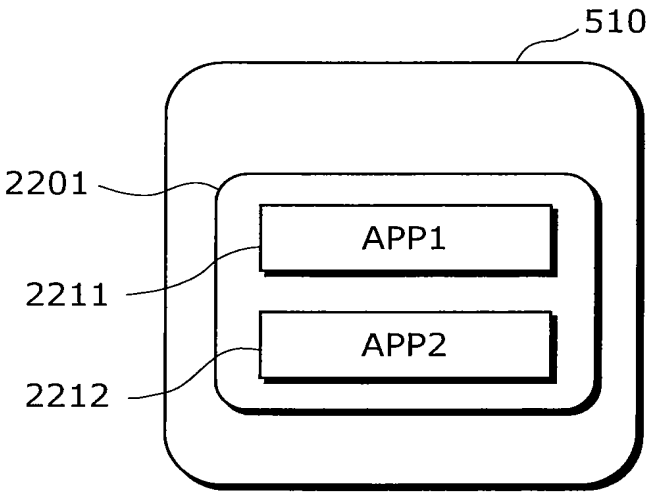

FIG. 25

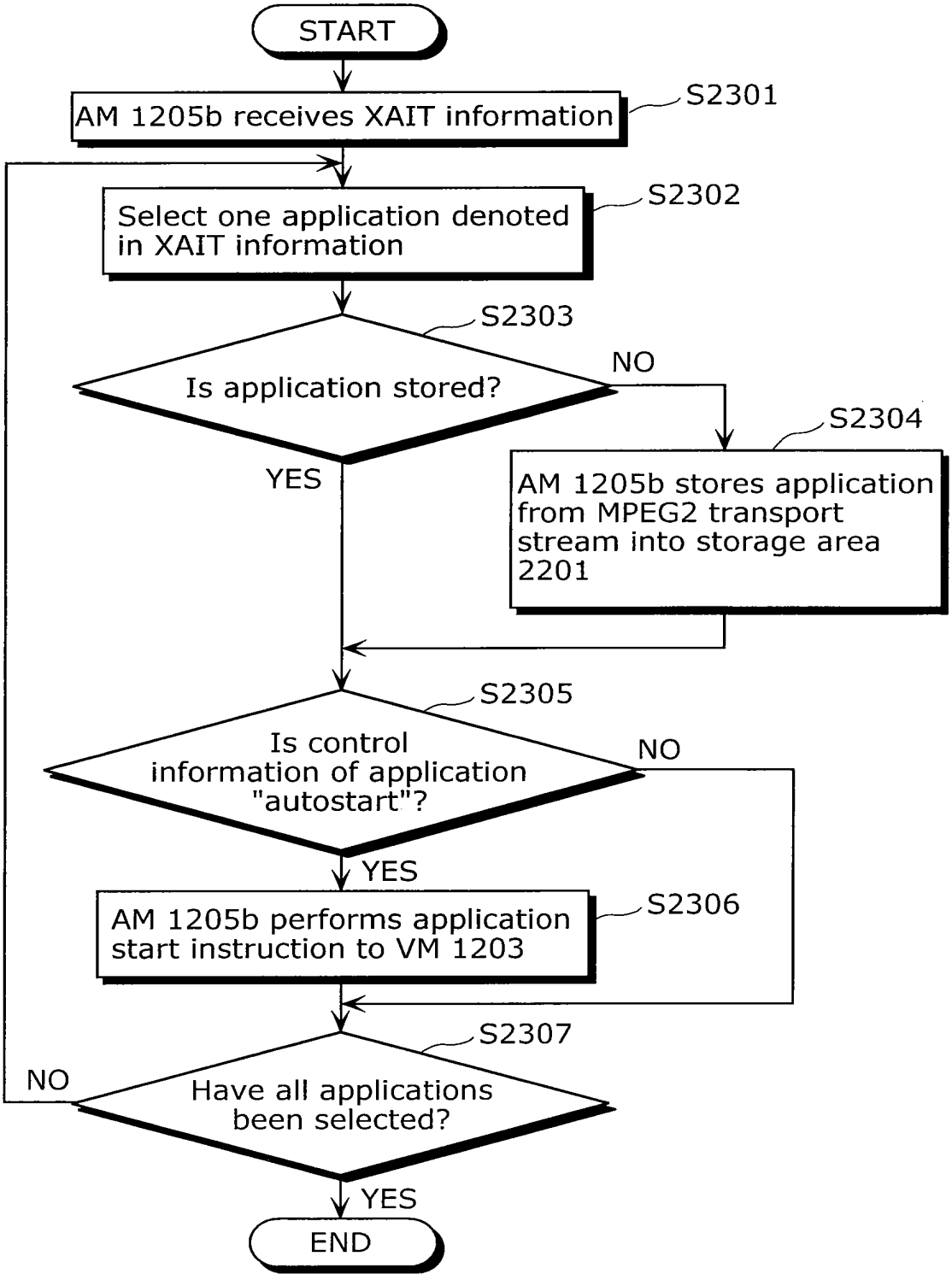
START
AM 1205b receives XAIT information
S2301
Select one application denoted in XAIT information
S2302
S2303
Is application stored?
NO
S2304
YES
AM 1205b stores application from MPEG2 transport stream into storage area 2201
S2305
Is control information of application "autostart"?
NO
YES
AM 1205b performs application start instruction to VM 1203
S2306
S2307
NO
Have all applications been selected?
YES
END

FIG. 26

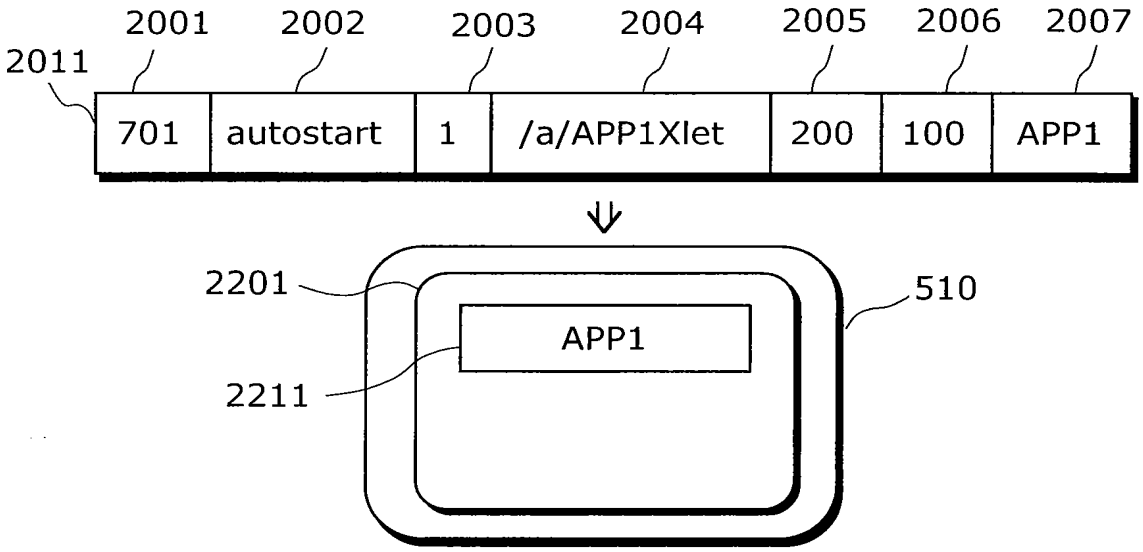
2001
2002
2003
2004
2005
2006
2007
2011
701
autostart
1
/a/APP1Xlet
200
100
APP1
2201
510
APP1
2211

FIG. 27

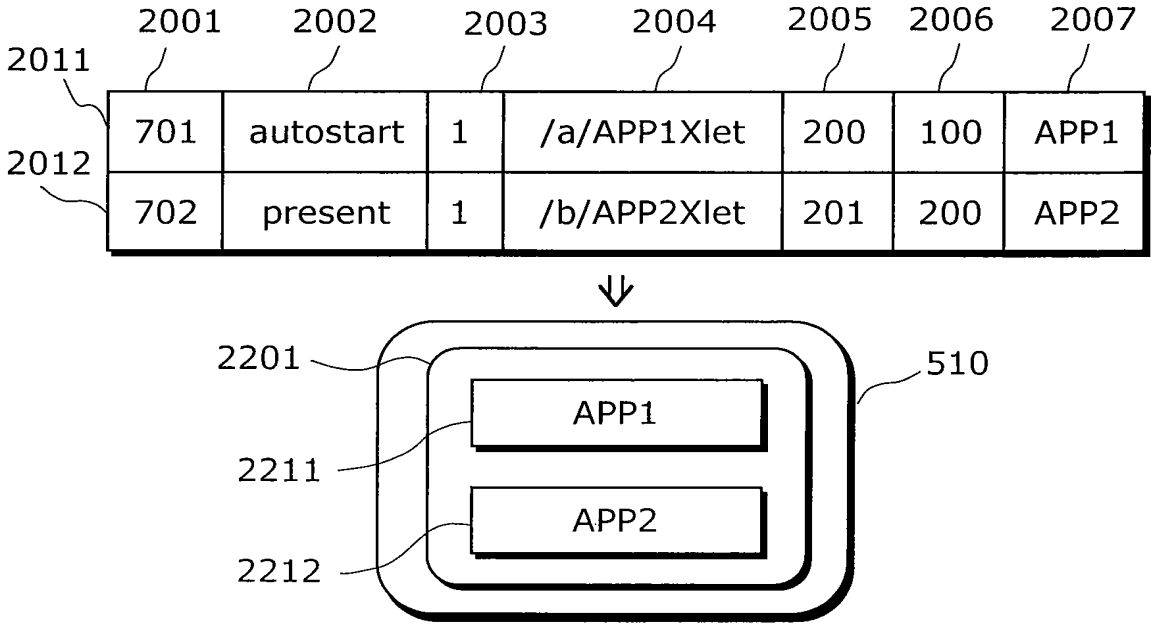
2001
2002
2003
2004
2005
2006
2007
2011
701
autostart
1
/a/APP1Xlet
200
100
APP1
2012
702
present
1
/b/APP2Xlet
201
200
APP2
2201
510
APP1
2211
APP2
2212

FIG. 28

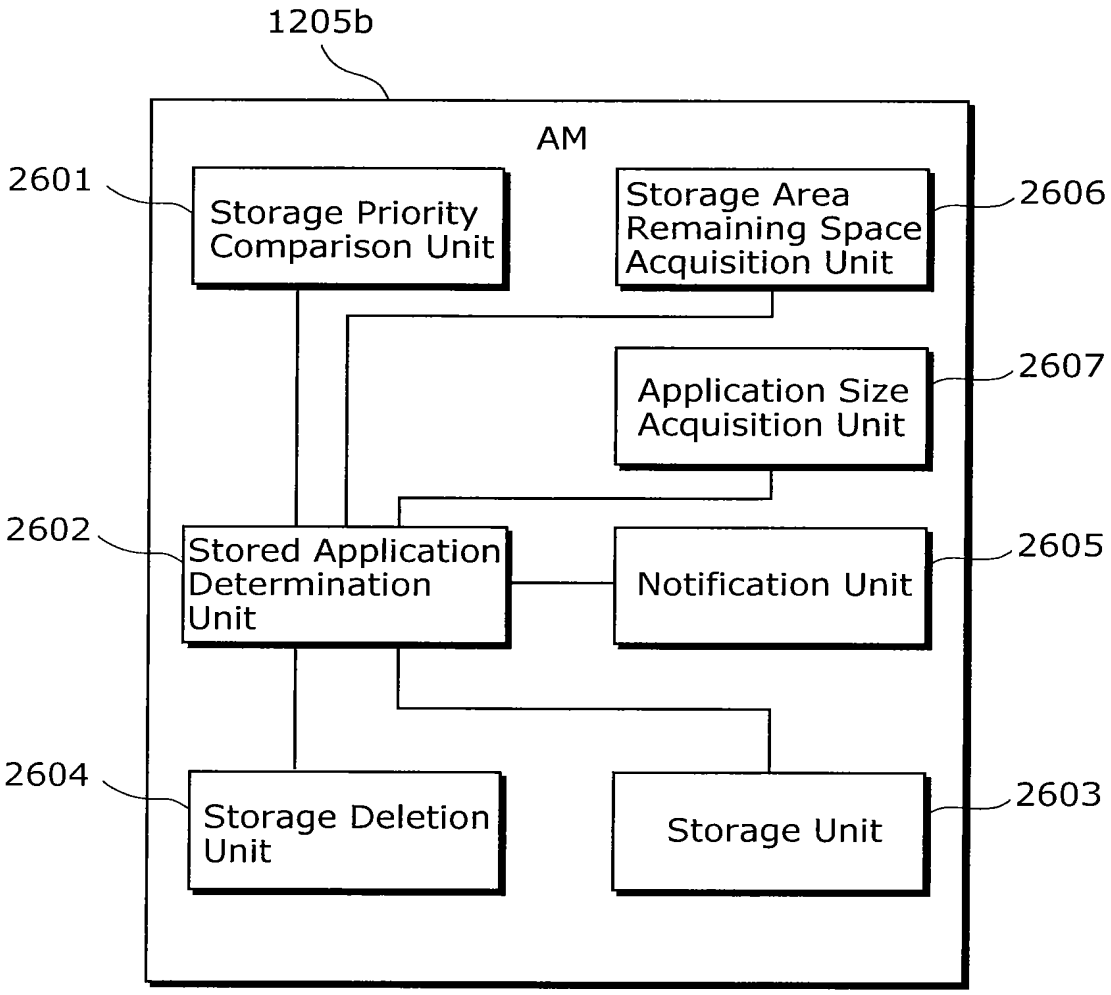
1205b
AM
2601
Storage Priority Comparison Unit
Storage Area Remaining Space Acquisition Unit
2606
Application Size Acquisition Unit
2607
2602
Stored Application Determination Unit
Notification Unit
2605
2604
Storage Deletion Unit
Storage Unit
2603

FIG. 29

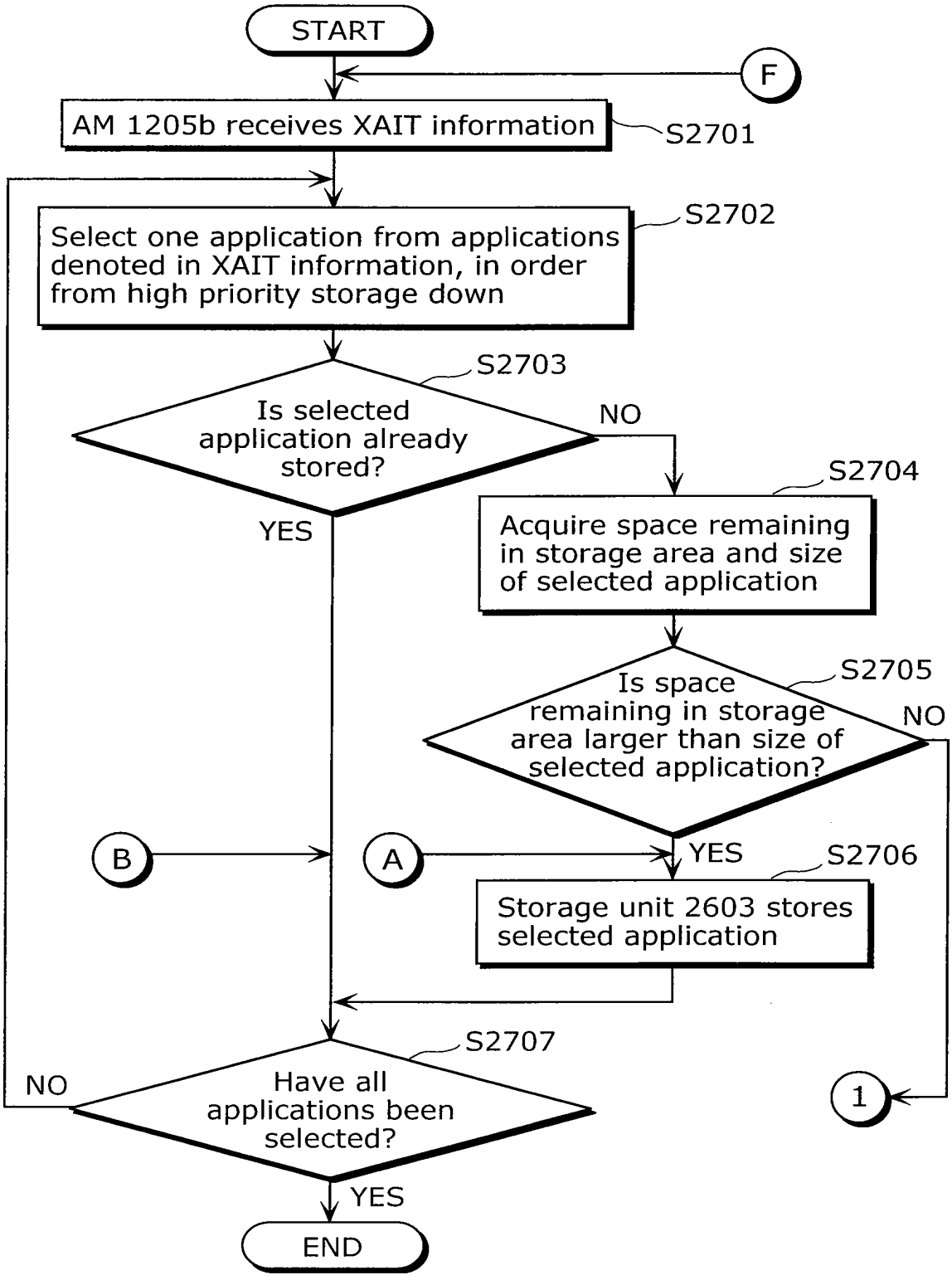
START
F
AM 1205b receives XAIT information
S2701
Select one application from applications denoted in XAIT information, in order from high priority storage down
S2702
S2703
Is selected application already stored?
NO
YES
S2704
Acquire space remaining in storage area and size of selected application
S2705
Is space remaining in storage area larger than size of selected application?
NO
YES
B
A
S2706
Storage unit 2603 stores selected application
S2707
Have all applications been selected?
NO
YES
1
END

FIG. 30

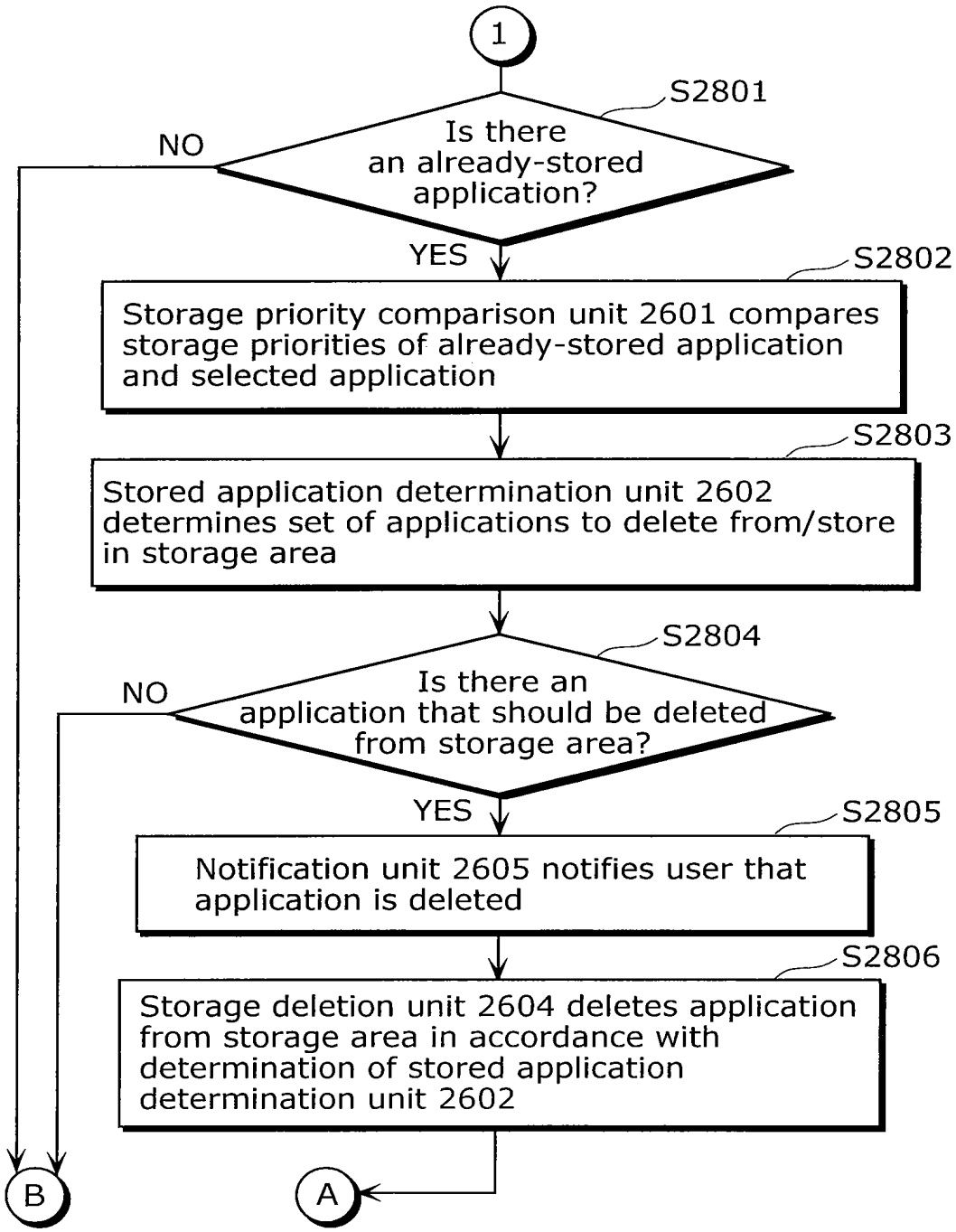
1
S2801
Is there an already-stored application?
NO
YES
S2802
Storage priority comparison unit 2601 compares storage priorities of already-stored application and selected application
S2803
Stored application determination unit 2602 determines set of applications to delete from/store in storage area
S2804
Is there an application that should be deleted from storage area?
NO
YES
S2805
Notification unit 2605 notifies user that application is deleted
S2806
Storage deletion unit 2604 deletes application from storage area in accordance with determination of stored application determination unit 2602
B
A

FIG. 31

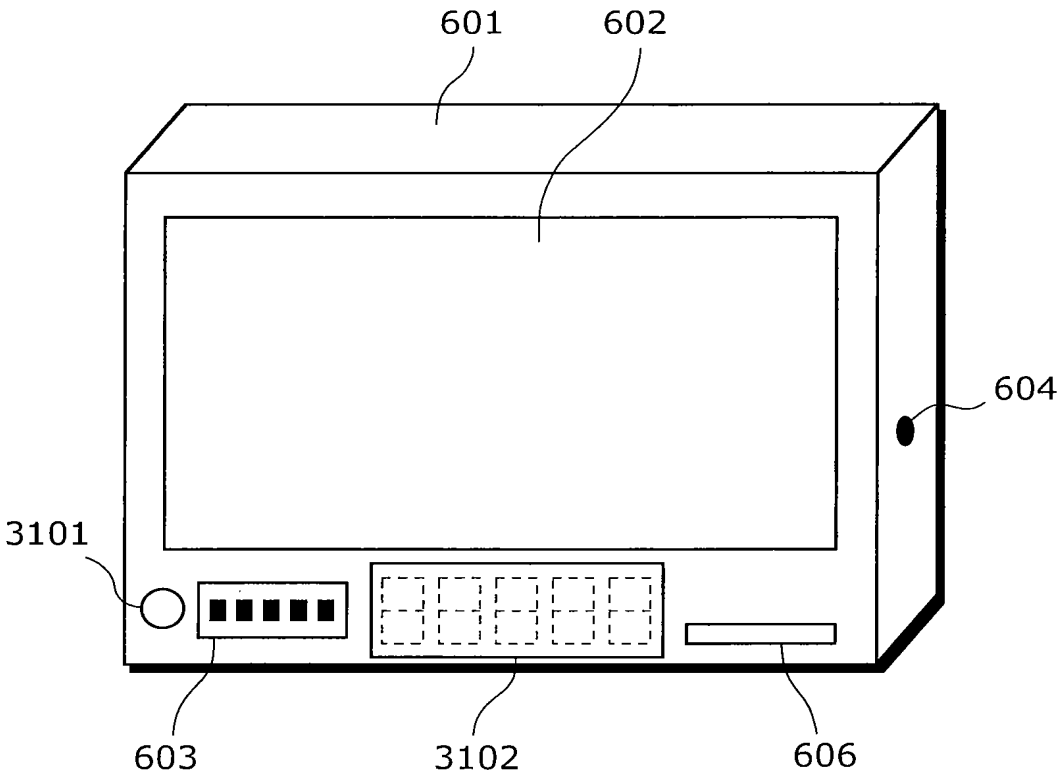

FIG. 32

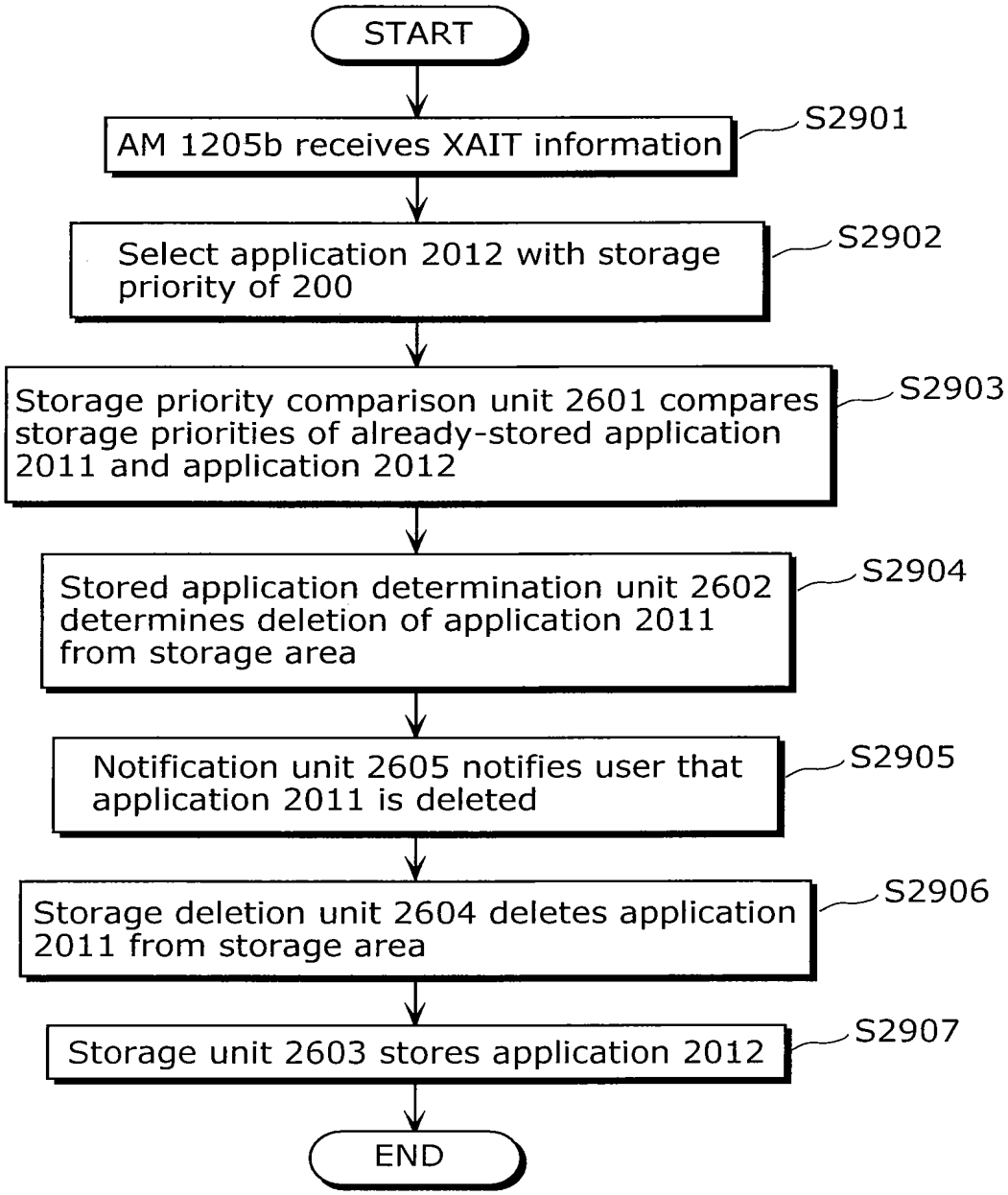
START
AM 1205b receives XAIT information
S2901
Select application 2012 with storage priority of 200
S2902
Storage priority comparison unit 2601 compares storage priorities of already-stored application 2011 and application 2012
S2903
Stored application determination unit 2602 determines deletion of application 2011 from storage area
S2904
Notification unit 2605 notifies user that application 2011 is deleted
S2905
Storage deletion unit 2604 deletes application 2011 from storage area
S2906
Storage unit 2603 stores application 2012
S2907
END

FIG. 33

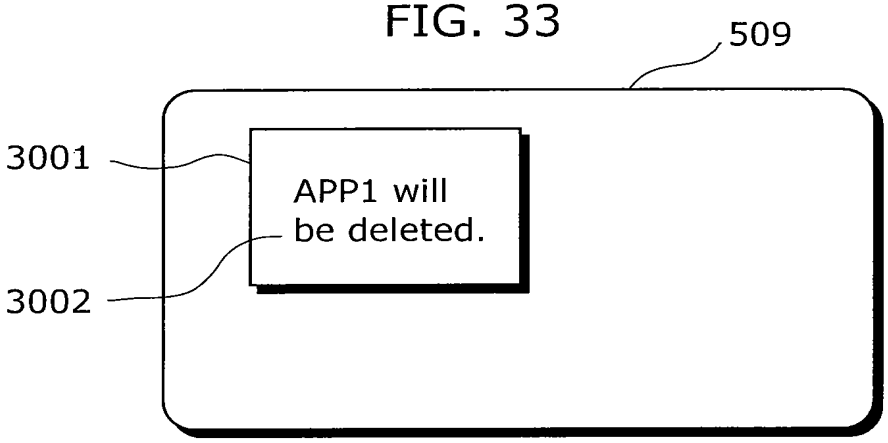

FIG. 34A

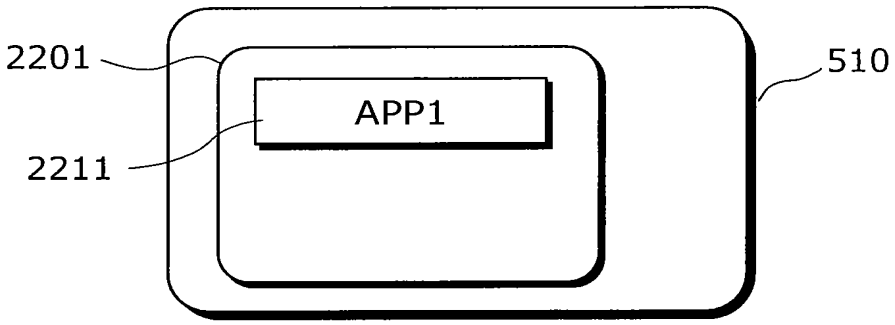

FIG. 34B

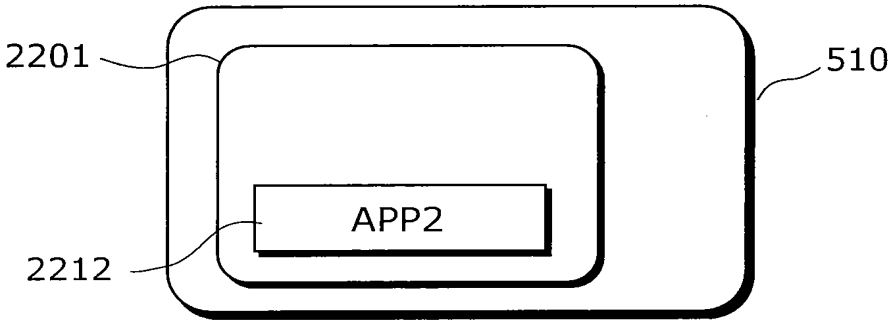

FIG. 35A

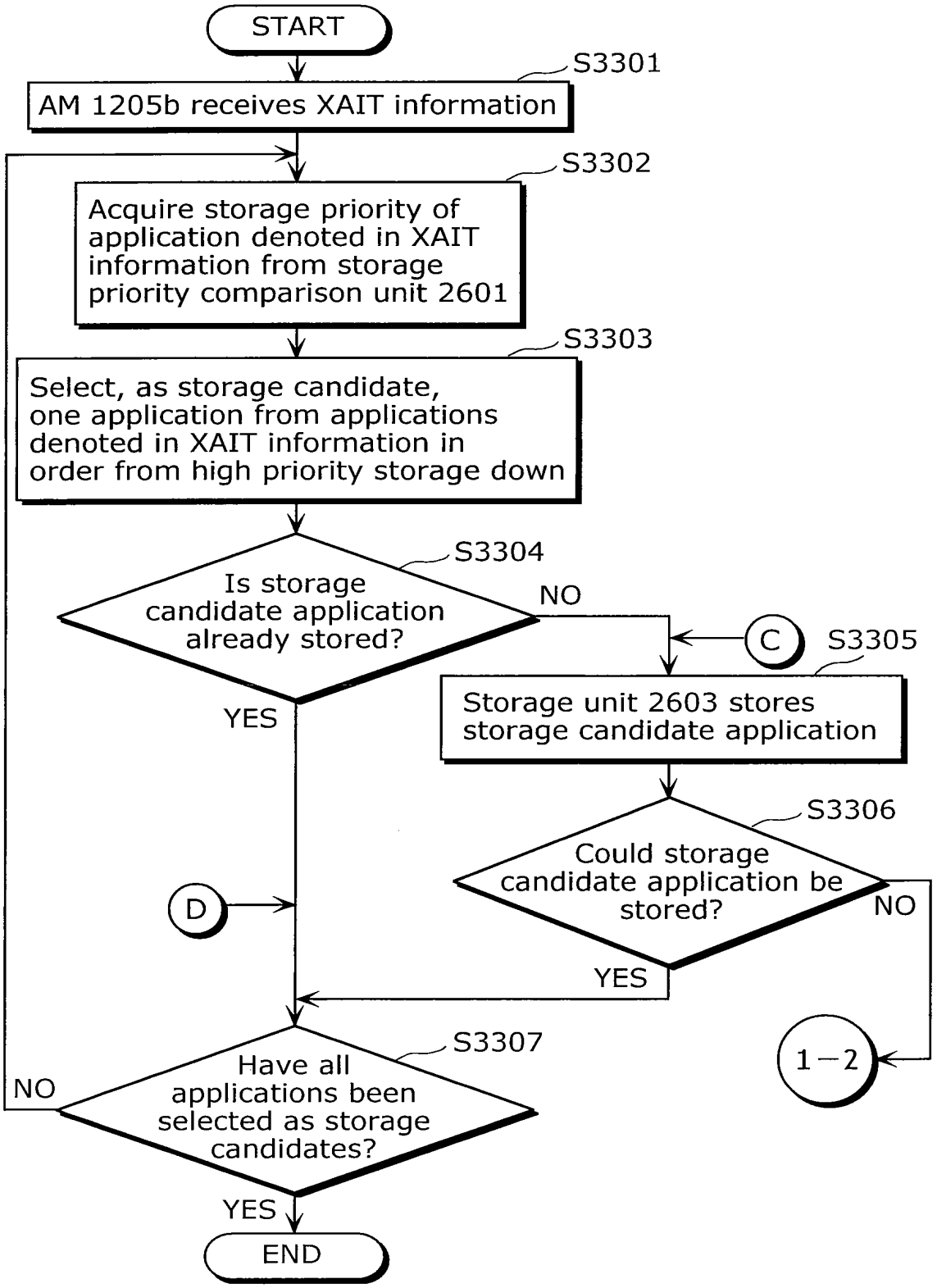
START
S3301
AM 1205b receives XAIT information
S3302
Acquire storage priority of application denoted in XAIT information from storage priority comparison unit 2601
S3303
Select, as storage candidate, one application from applications denoted in XAIT information in order from high priority storage down
S3304
Is storage candidate application already stored?
NO
YES
C
S3305
Storage unit 2603 stores storage candidate application
S3306
Could storage candidate application be stored?
NO
YES
D
1−2
S3307
Have all applications been selected as storage candidates?
NO
YES
END

FIG. 35B

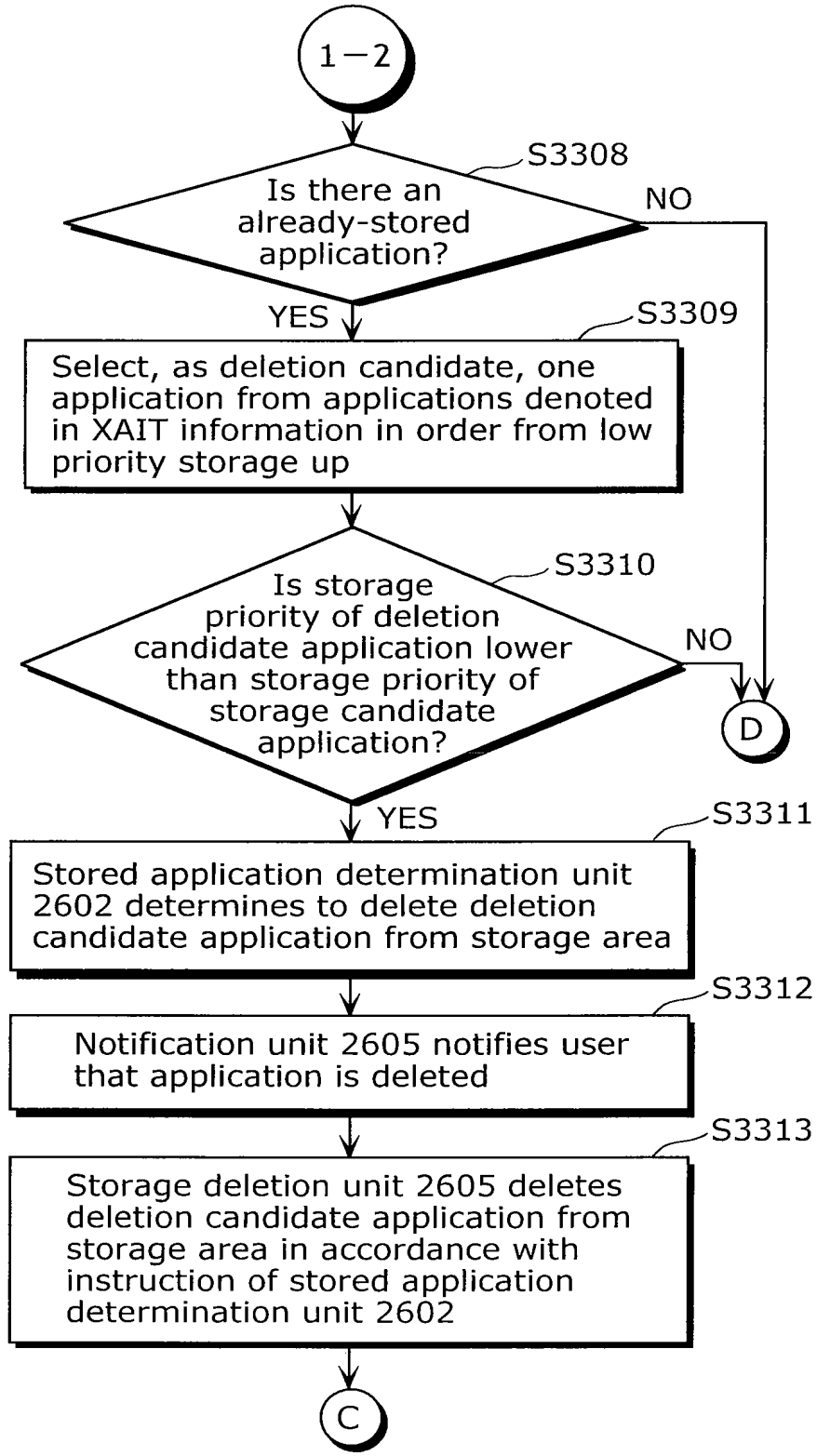
1−2
S3308
Is there an already-stored application?
NO
YES
S3309
Select, as deletion candidate, one application from applications denoted in XAIT information in order from low priority storage up
S3310
Is storage priority of deletion candidate application lower than storage priority of storage candidate application?
NO
D
YES
S3311
Stored application determination unit 2602 determines to delete deletion candidate application from storage area
S3312
Notification unit 2605 notifies user that application is deleted
S3313
Storage deletion unit 2605 deletes deletion candidate application from storage area in accordance with instruction of stored application determination unit 2602
C

FIG. 36

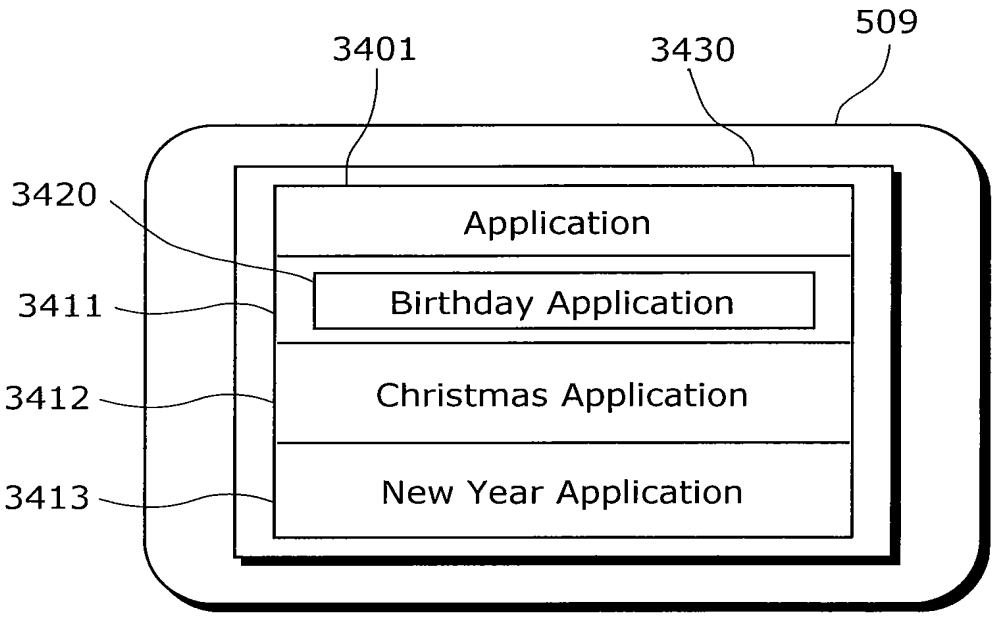
509
3401
3430
3420
Application
3411
Birthday Application
3412
Christmas Application
3413
New Year Application

FIG. 37

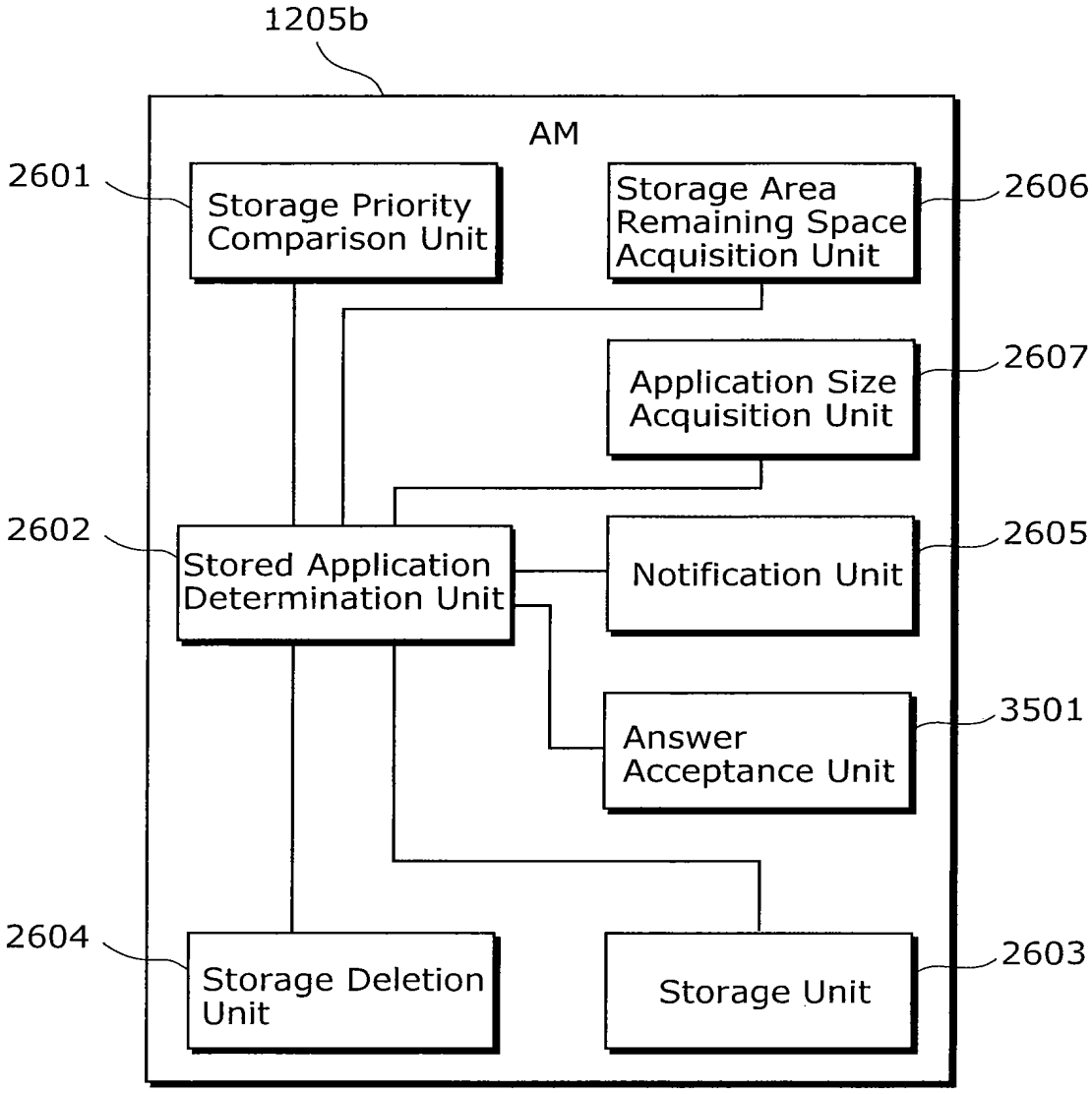
1205b
AM
2601
Storage Priority Comparison Unit
Storage Area Remaining Space Acquisition Unit
2606
Application Size Acquisition Unit
2607
2602
Stored Application Determination Unit
Notification Unit
2605
Answer Acceptance Unit
3501
2604
Storage Deletion Unit
Storage Unit
2603

FIG. 38

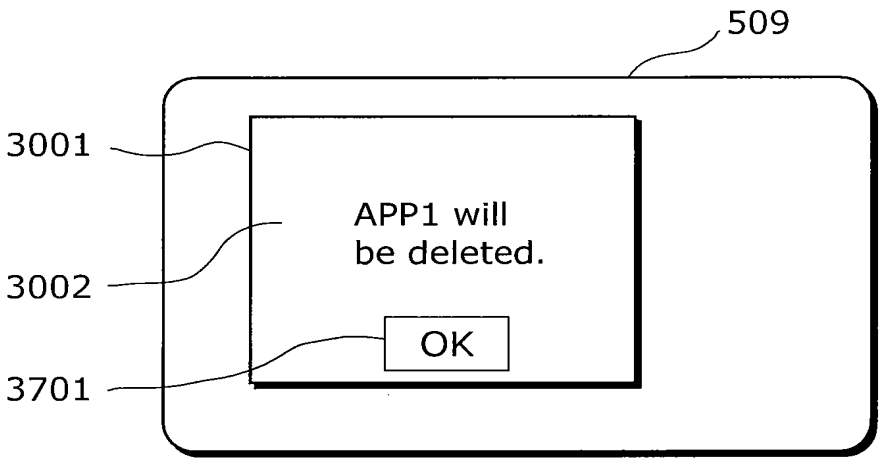

FIG. 39

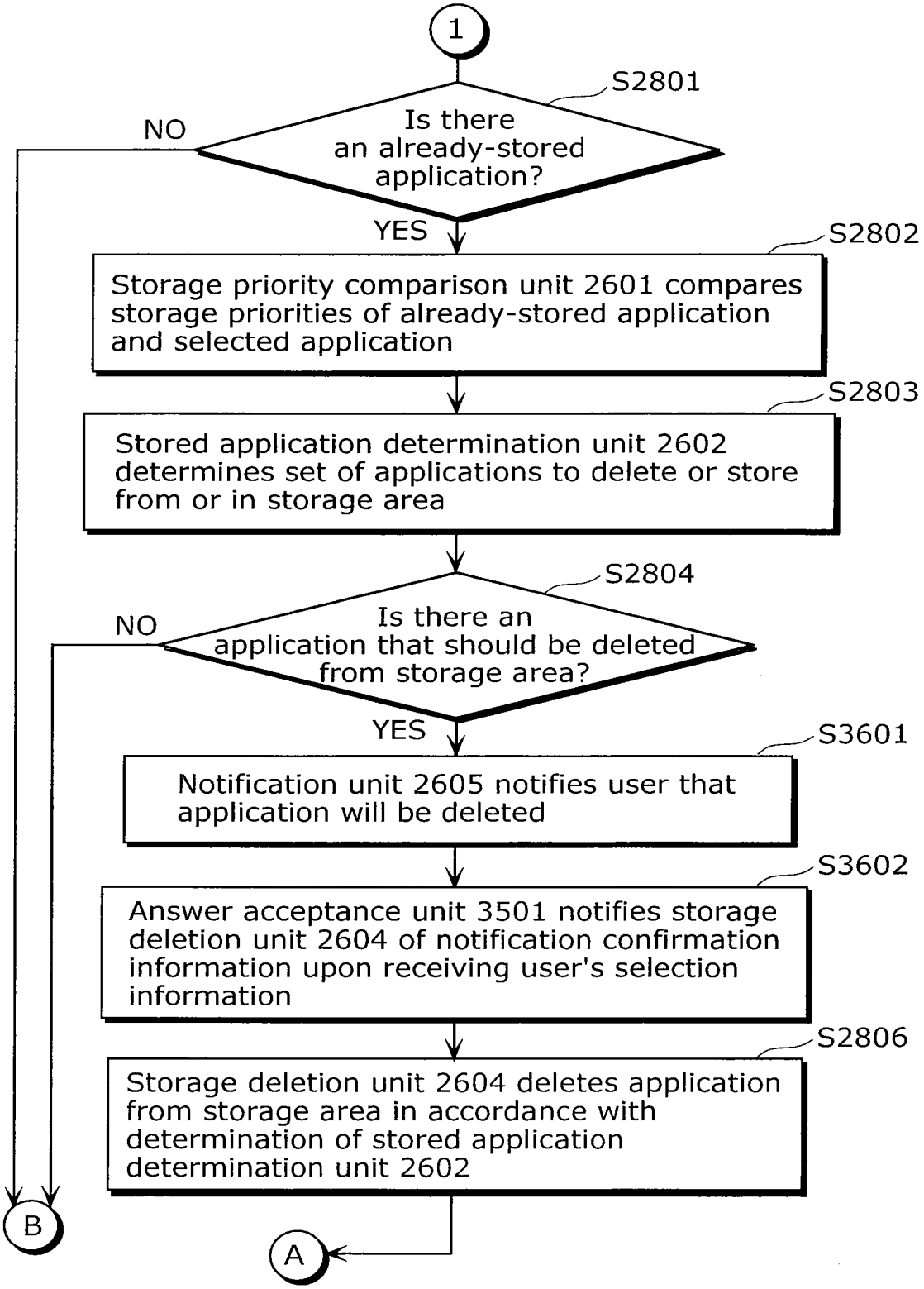
1
S2801
Is there an already-stored application?
NO
YES
S2802
Storage priority comparison unit 2601 compares storage priorities of already-stored application and selected application
S2803
Stored application determination unit 2602 determines set of applications to delete or store from or in storage area
S2804
Is there an application that should be deleted from storage area?
NO
YES
S3601
Notification unit 2605 notifies user that application will be deleted
S3602
Answer acceptance unit 3501 notifies storage deletion unit 2604 of notification confirmation information upon receiving user's selection information
S2806
Storage deletion unit 2604 deletes application from storage area in accordance with determination of stored application determination unit 2602
B
A

FIG. 40

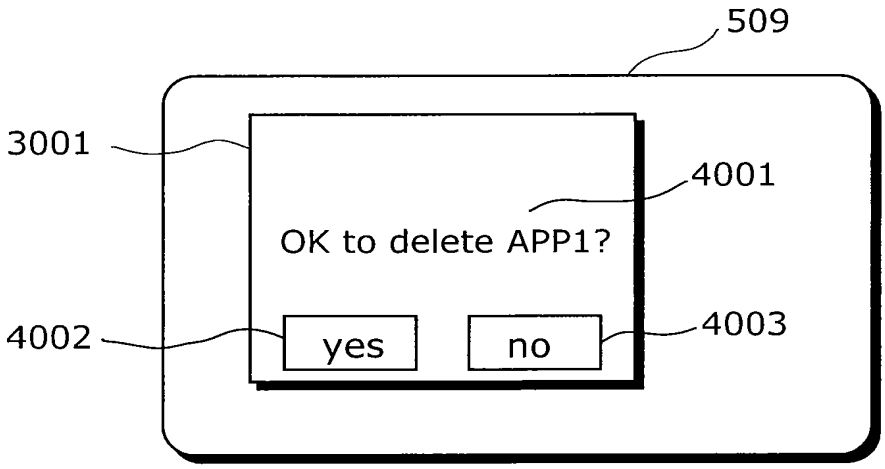

FIG. 41

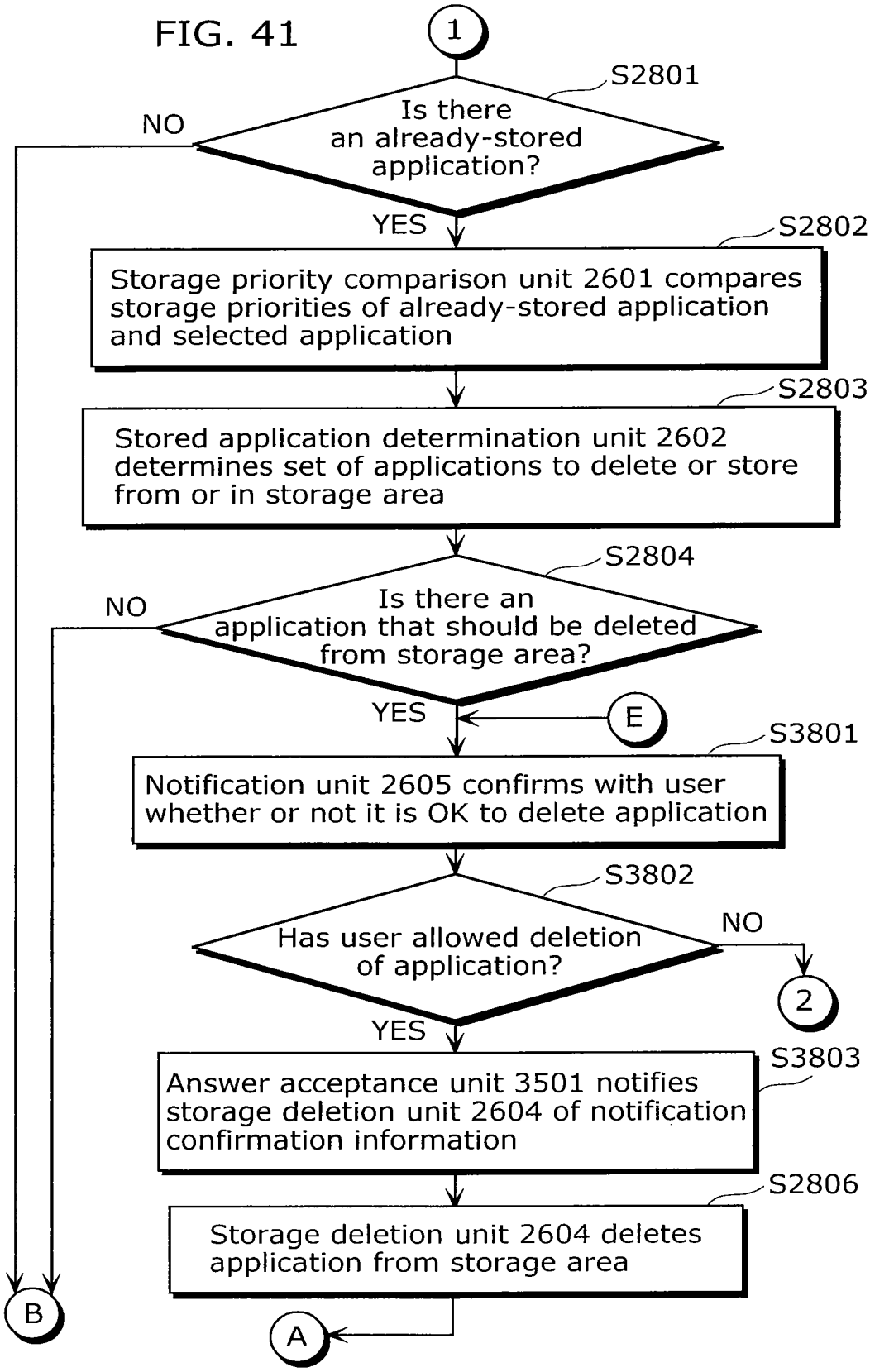
1
S2801
Is there an already-stored application?
NO
YES
S2802
Storage priority comparison unit 2601 compares storage priorities of already-stored application and selected application
S2803
Stored application determination unit 2602 determines set of applications to delete or store from or in storage area
S2804
Is there an application that should be deleted from storage area?
NO
YES
E
S3801
Notification unit 2605 confirms with user whether or not it is OK to delete application
S3802
Has user allowed deletion of application?
NO
2
YES
S3803
Answer acceptance unit 3501 notifies storage deletion unit 2604 of notification confirmation information
S2806
Storage deletion unit 2604 deletes application from storage area
B
A

FIG. 42

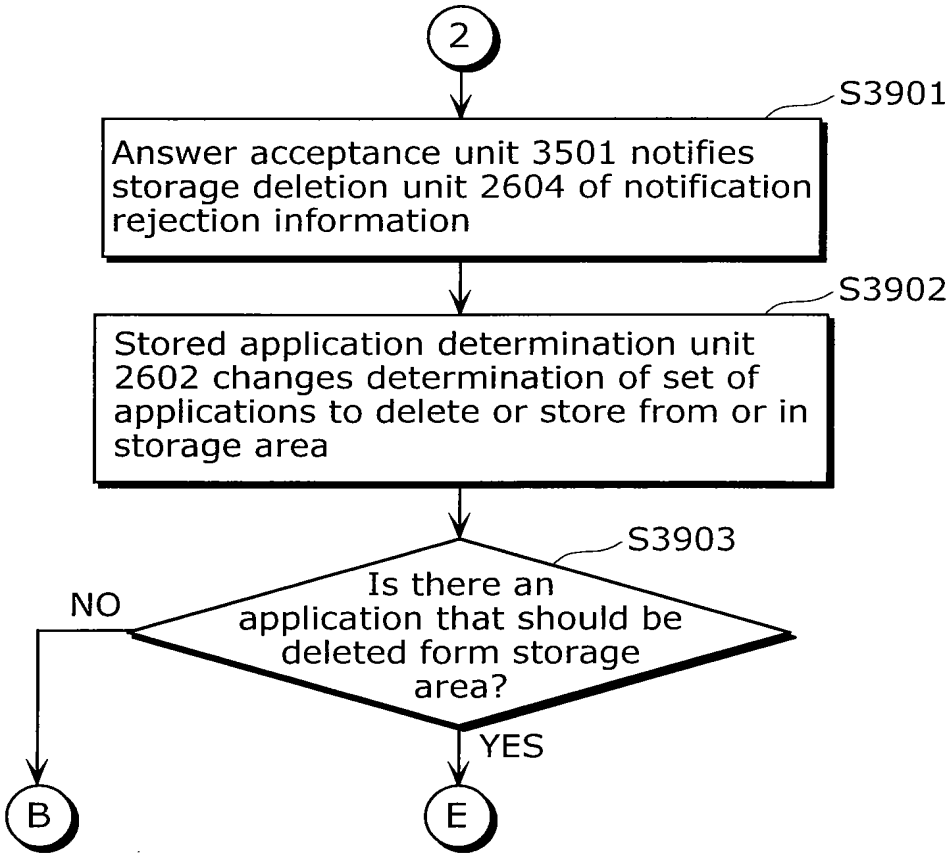
2
S3901
Answer acceptance unit 3501 notifies storage deletion unit 2604 of notification rejection information
S3902
Stored application determination unit 2602 changes determination of set of applications to delete or store from or in storage area
S3903
Is there an application that should be deleted form storage area?
NO
YES
B
E

FIG. 43

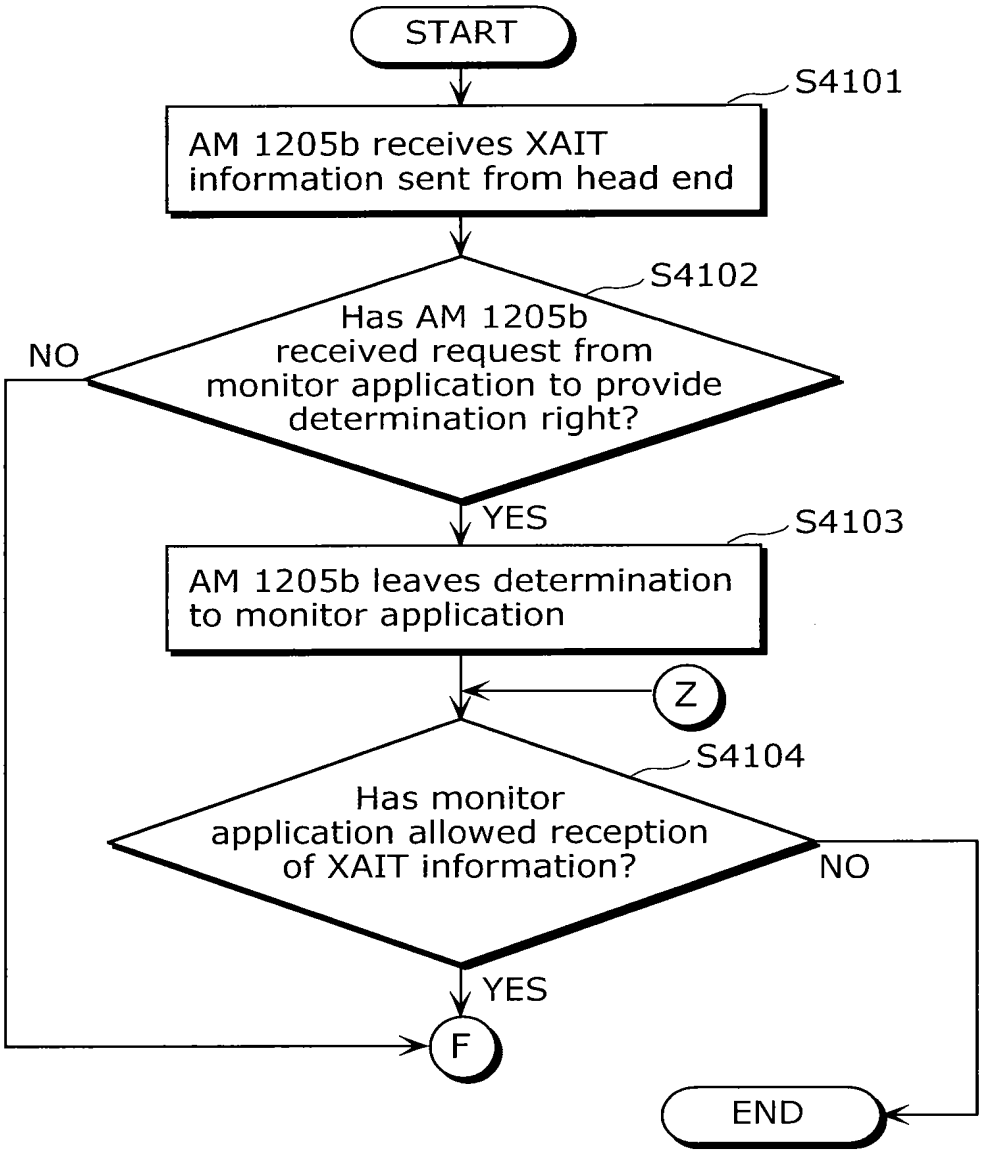
START
S4101
AM 1205b receives XAIT information sent from head end
S4102
Has AM 1205b received request from monitor application to provide determination right?
NO
YES
S4103
AM 1205b leaves determination to monitor application
Z
S4104
Has monitor application allowed reception of XAIT information?
NO
YES
F
END

FIG. 44

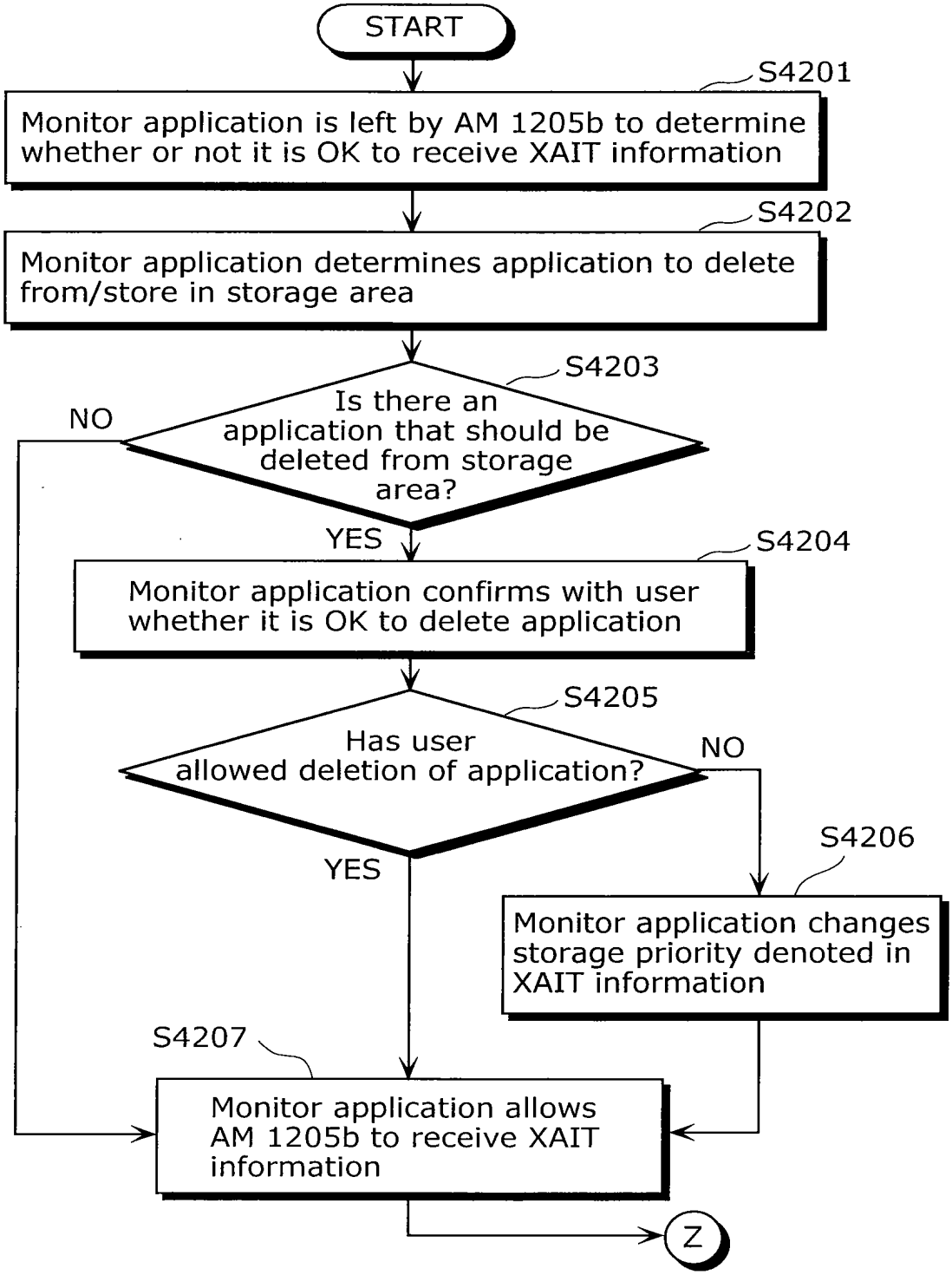
START
S4201
Monitor application is left by AM 1205b to determine whether or not it is OK to receive XAIT information
S4202
Monitor application determines application to delete from/store in storage area
S4203
Is there an application that should be deleted from storage area?
NO
YES
S4204
Monitor application confirms with user whether it is OK to delete application
S4205
Has user allowed deletion of application?
NO
YES
S4206
Monitor application changes storage priority denoted in XAIT information
S4207
Monitor application allows AM 1205b to receive XAIT information
Z

FIG. 45

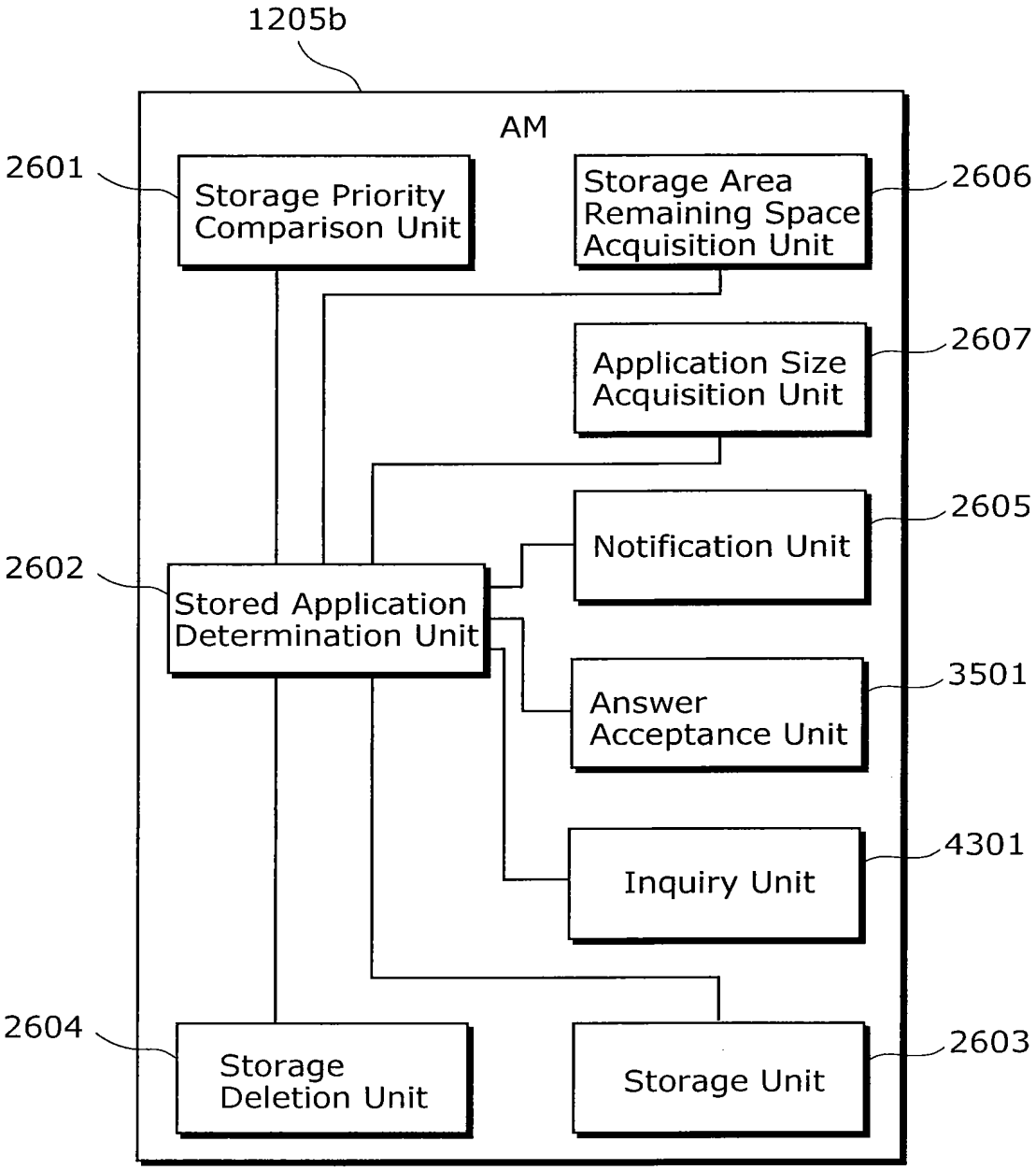
1205b
AM
2601
Storage Priority Comparison Unit
Storage Area Remaining Space Acquisition Unit
2606
Application Size Acquisition Unit
2607
Notification Unit
2605
2602
Stored Application Determination Unit
Answer Acceptance Unit
3501
Inquiry Unit
4301
2604
Storage Deletion Unit
Storage Unit
2603

FIG. 46

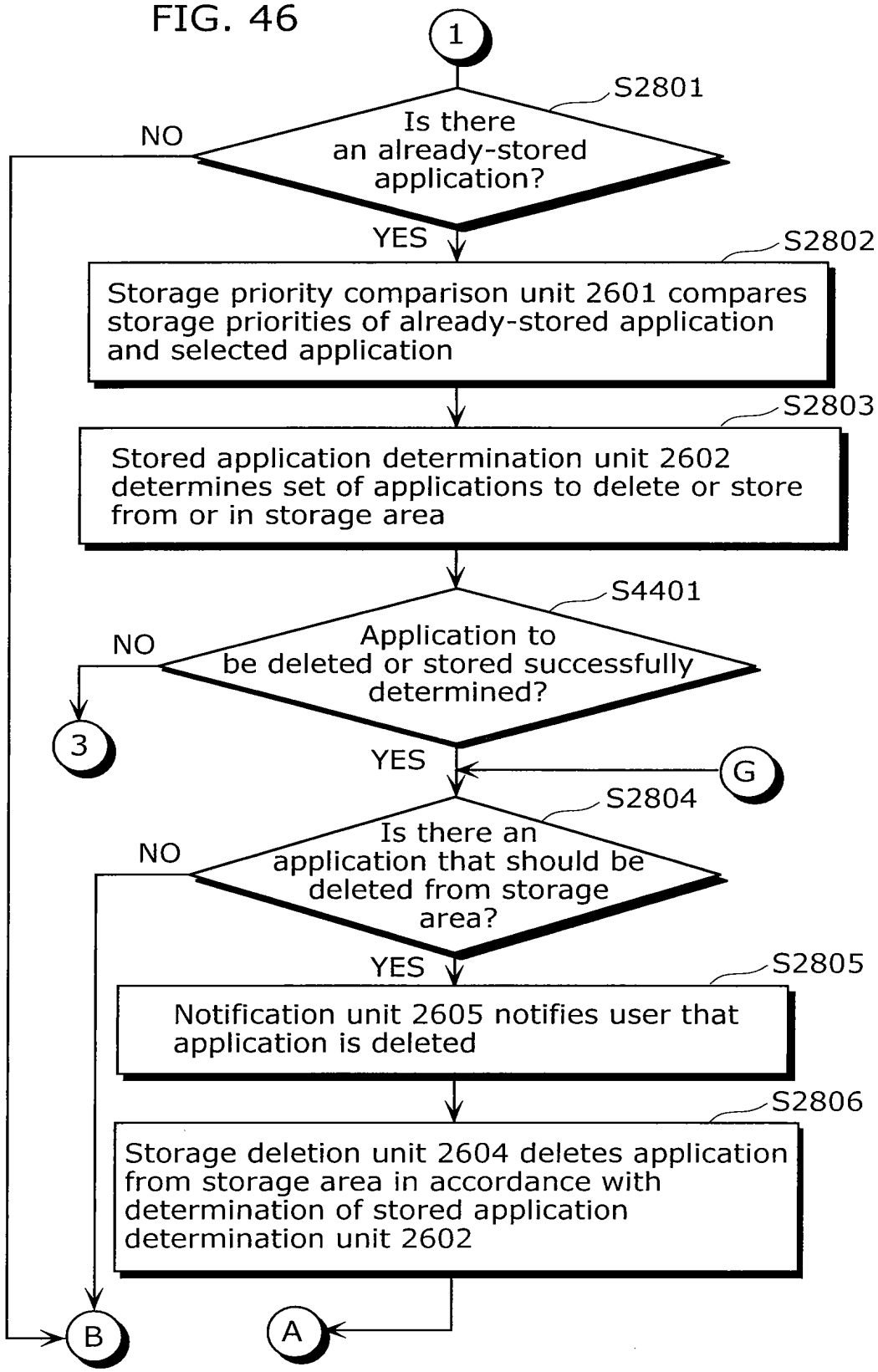
1
S2801
Is there an already-stored application?
NO
YES
S2802
Storage priority comparison unit 2601 compares storage priorities of already-stored application and selected application
S2803
Stored application determination unit 2602 determines set of applications to delete or store from or in storage area
S4401
Application to be deleted or stored successfully determined?
NO
3
YES
G
S2804
Is there an application that should be deleted from storage area?
NO
YES
S2805
Notification unit 2605 notifies user that application is deleted
S2806
Storage deletion unit 2604 deletes application from storage area in accordance with determination of stored application determination unit 2602
B
A

FIG. 47

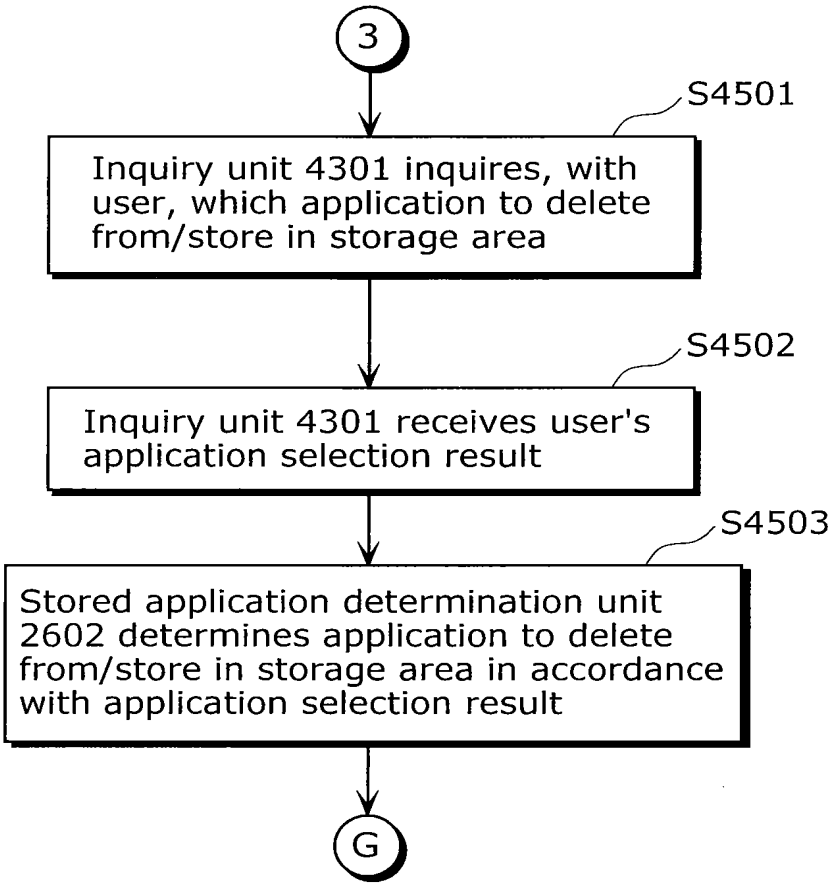
3
S4501
Inquiry unit 4301 inquires, with user, which application to delete from/store in storage area
S4502
Inquiry unit 4301 receives user's application selection result
S4503
Stored application determination unit 2602 determines application to delete from/store in storage area in accordance with application selection result
G

FIG. 48

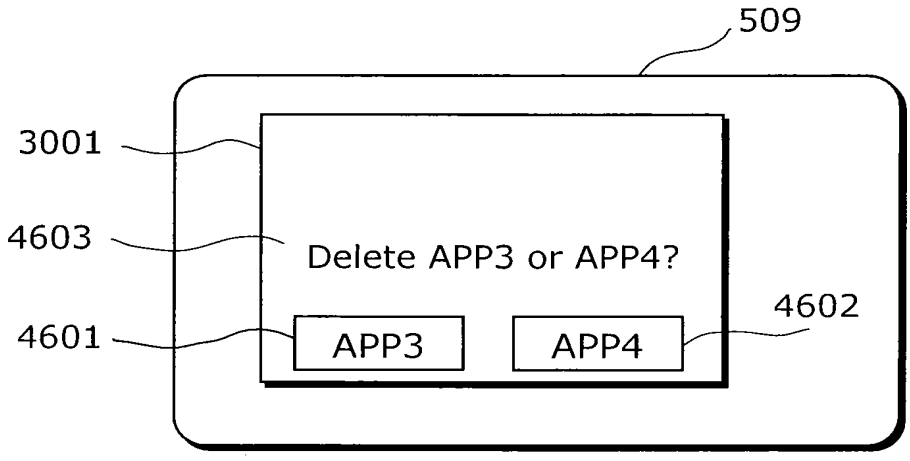
509
3001
4603
Delete APP3 or APP4?
4601
APP3
APP4
4602

FIG. 49

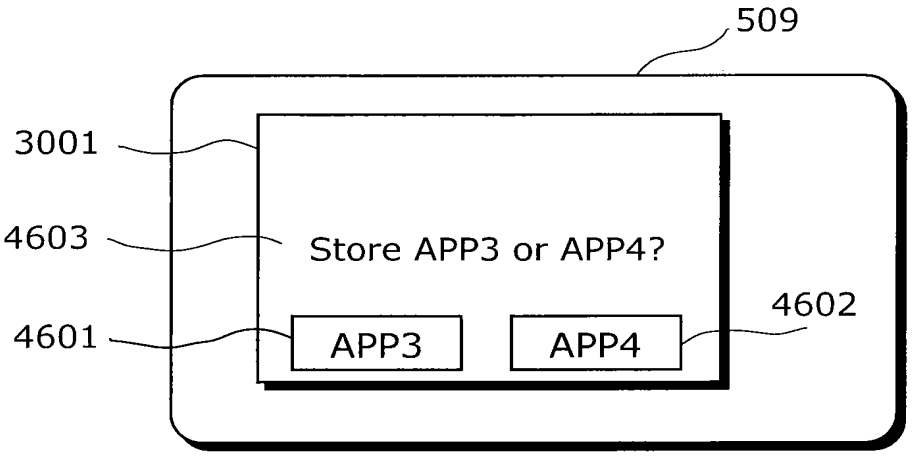
509
3001
4603
Store APP3 or APP4?
4601
APP3
APP4
4602

FIG. 50

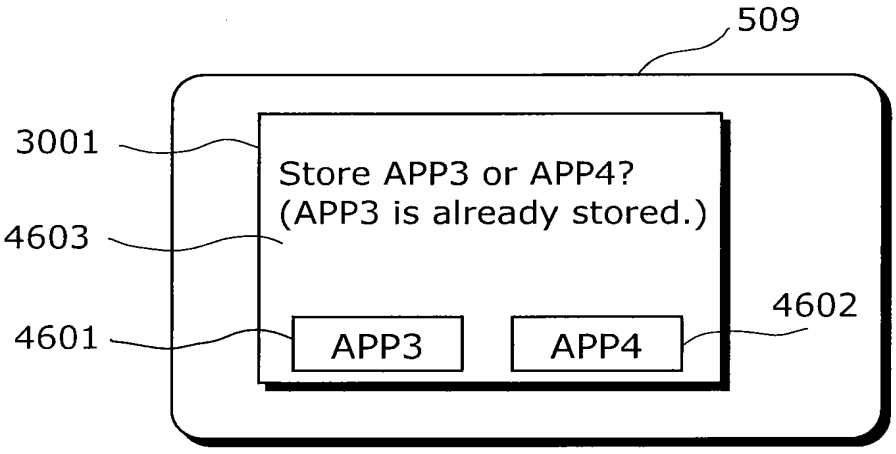
509
3001
Store APP3 or APP4?
(APP3 is already stored.)
4603
4601
APP3
APP4
4602

FIG. 51

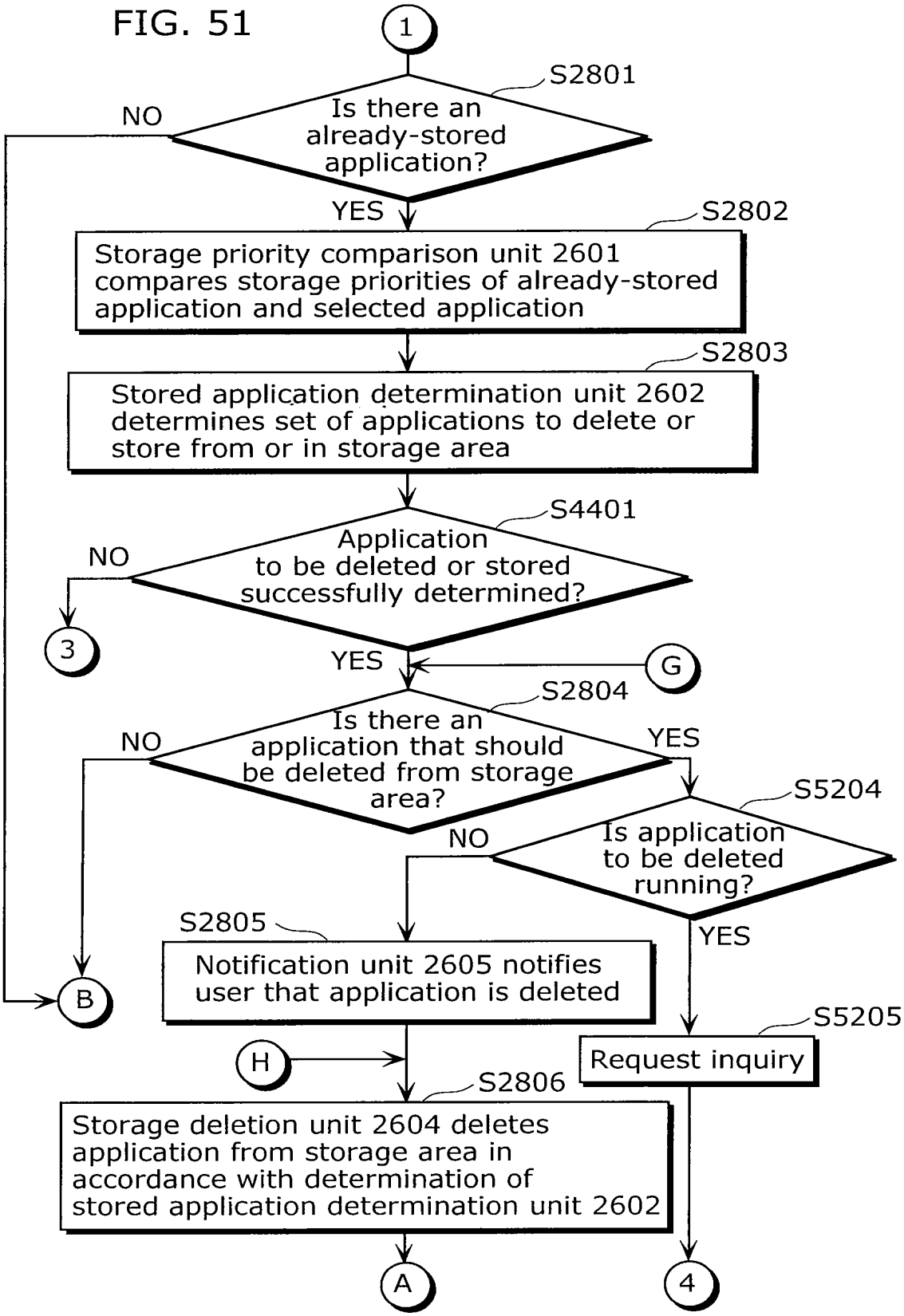
1
S2801
Is there an already-stored application?
NO
YES
S2802
Storage priority comparison unit 2601 compares storage priorities of already-stored application and selected application
S2803
Stored application determination unit 2602 determines set of applications to delete or store from or in storage area
S4401
Application to be deleted or stored successfully determined?
NO
3
YES
G
S2804
Is there an application that should be deleted from storage area?
NO
YES
S5204
Is application to be deleted running?
NO
YES
S2805
Notification unit 2605 notifies user that application is deleted
B
H
S5205
Request inquiry
S2806
Storage deletion unit 2604 deletes application from storage area in accordance with determination of stored application determination unit 2602
A
4

FIG. 52

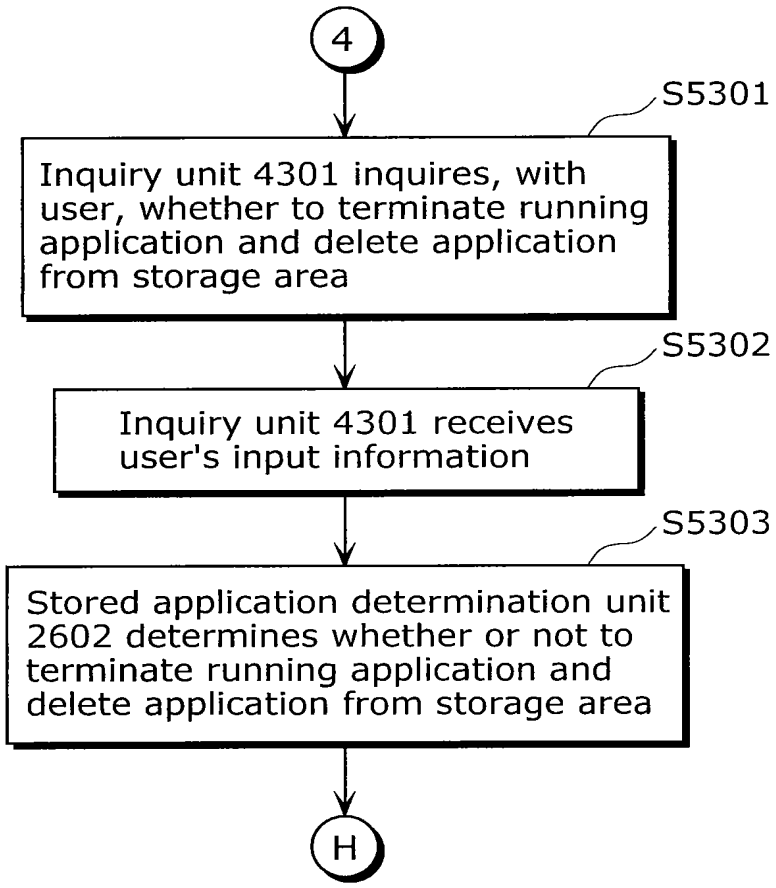
4
S5301
Inquiry unit 4301 inquires, with user, whether to terminate running application and delete application from storage area
S5302
Inquiry unit 4301 receives user's input information
S5303
Stored application determination unit 2602 determines whether or not to terminate running application and delete application from storage area
H

FIG. 53

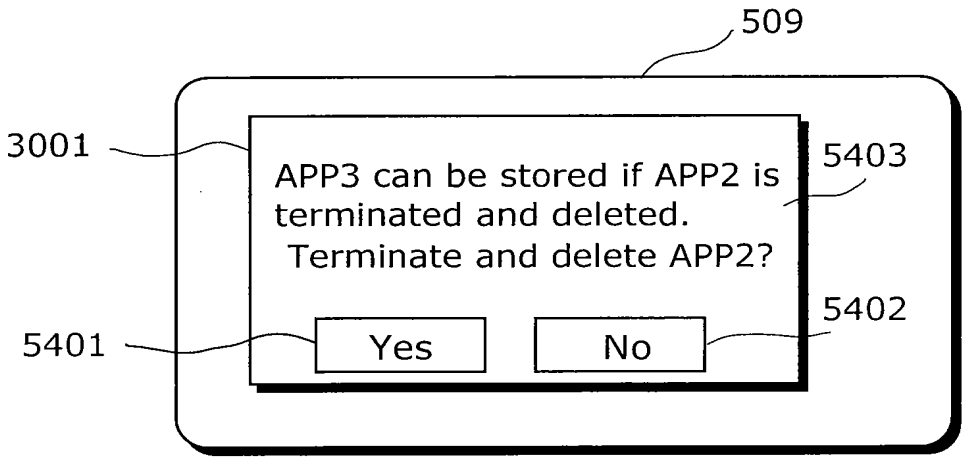
509
3001
APP3 can be stored if APP2 is terminated and deleted.
Terminate and delete APP2?
5403
5401
Yes
No
5402

FIG. 54

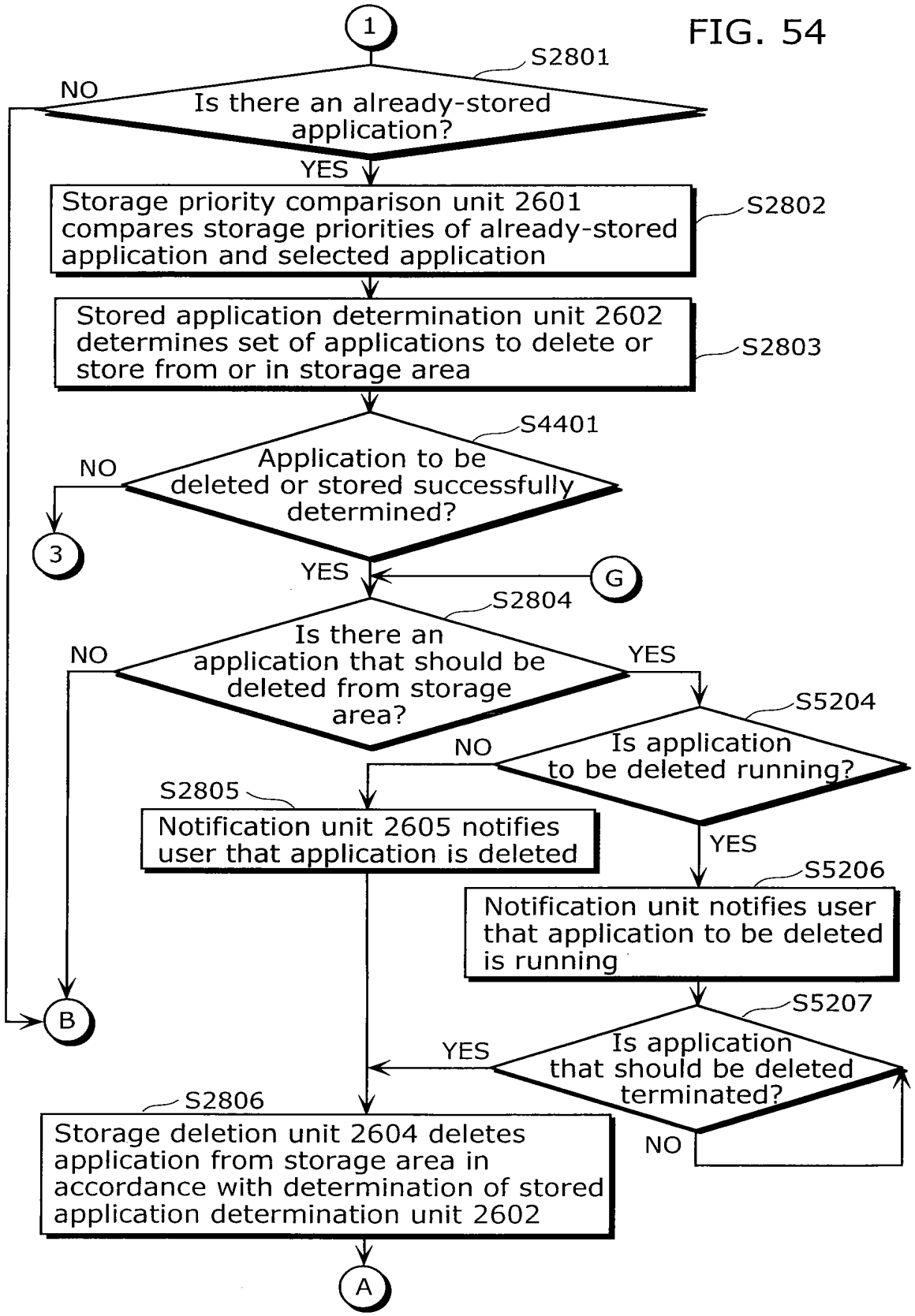
1
S2801
Is there an already-stored application?
NO
YES
Storage priority comparison unit 2601 compares storage priorities of already-stored application and selected application
S2802
Stored application determination unit 2602 determines set of applications to delete or store from or in storage area
S2803
S4401
Application to be deleted or stored successfully determined?
NO
3
YES
G
S2804
Is there an application that should be deleted from storage area?
NO
YES
S5204
Is application to be deleted running?
NO
S2805
Notification unit 2605 notifies user that application is deleted
YES
S5206
Notification unit notifies user that application to be deleted is running
S5207
Is application that should be deleted terminated?
YES
NO
B
S2806
Storage deletion unit 2604 deletes application from storage area in accordance with determination of stored application determination unit 2602
A

FIG. 55

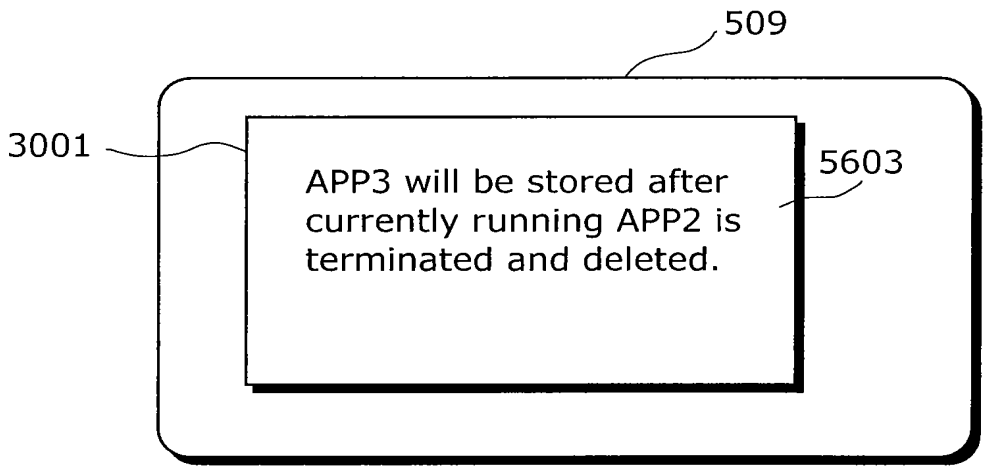

FIG. 56

2001	2002	4901	4902	2004	2005	2006	2007
4911 701	auto start	http	123.456.0.1	/a /APP1Xlet	200	100	APP1
4912 702	pre sent	ftp	123.456.0.2	/b /APP2Xlet	201	200	APP2